THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LVIII. No. 1471.] LONDON, JULY 21, 1891. [43RD YEAR. Price 6d.

WOLSTON'S Paste and Ready Mixed for Use.

Guaranteed Free from Adulteration. **TORBAY PAINTS.**

FOR GASHOLDERS, &c., &c.

The Original "Torbay Paints"
As supplied during the present and many preceding years to the LONDON GASLIGHT & COKE COMPANY.

Special Quotations to Gas Companies.

TORBAY & DART PAINT Co., Ld.,
23, Gt. George St., Westminster, S.W.
Works: DARTMOUTH, DEVON.

— ESTABLISHED 1830. —
PARKER & LESTER,
Manufacturers & Contractors.

THE ONLY MAKERS OF
PATENT ANTIMONY PAINT,
Parker's Imperial Black Varnish,
Oxide Paints, Oils, and General Stores for Gas and Water Works.

WORKS:
ORMSIDE STREET, OLD KENT ROAD, LONDON.

Ashmore, Benson, Pease, & Co., Ld.,
STOCKTON-ON-TEES,
Manufacturing Gas Engineers.
See Advertisement, p. 138.

CEMENT
EARLE'S
BEST
Portland Cement
MANUFACTURED BY
GEO. & THOS. EARLE,
HULL.

Offices: 7, 8, & 9, PIER STREET.
Works: WILMINGTON.
STOREAGE CAPACITY 10,000 Tons.

ESTABLISHED 1811—OVER THREE QUARTERS OF A CENTURY.
Telegraphic Address: "CEMENT HULL."

J. UNGAR & CO.,
Manufacturers & Patentees of every Description of
IMPROVED LAMPS
FOR
Streets, Markets, Shops, &c.
WHOLESALE DEPOT: 52, COMMERCIAL ST., LONDON, E.
We specially solicit Government and Local Board Contracts for General Lighting.

SELF-CONTAINED DUST-FUEL FURNACE.
MELDRUM'S PATENT.

Extract from the *Smethwick Telephone,* June 13, 1891.

GAS COMMITTEE.

"The Manager [B. W. Smith, Esq.] reported that the adoption of MELDRUM'S PATENT FURNACES, he estimated, had resulted in a saving of 150 tons of Slack during the nine months they had been at work in the Boiler-House, and 360 tons of Slack during four months in the Retort-House; the fuel used in place of slack being the fine coke dust which formerly had to be carted or boated away at considerable expense."

MELDRUM BROS., Engineers,
ATLANTIC WORKS, 13, CITY ROAD, MANCHESTER.

DANIEL HOWARD,

(Successor to the late BENJ. WHITEHOUSE),

GASHOLDER & BOILER WORKS,

WEST BROMWICH, NEAR BIRMINGHAM

(ESTABLISHED 1765).

MANUFACTURER OF TELESCOPIC AND SINGLE GASHOLDERS,

WROUGHT AND CAST IRON TANKS FOR DITTO,

PURIFIERS, CONDENSERS, SCRUBBERS, HYDRAULIC MAINS, and all kinds of GAS APPARATUS,

Wrought-Iron Roofs, Bridges, Girders, &c.,

Steam, Hot Water, and Range Boilers, Tanks, Cisterns, Boats, and all kinds of Wrought-Iron Work.

DRAWINGS, SPECIFICATIONS, AND ESTIMATES SUPPLIED ON APPLICATION.

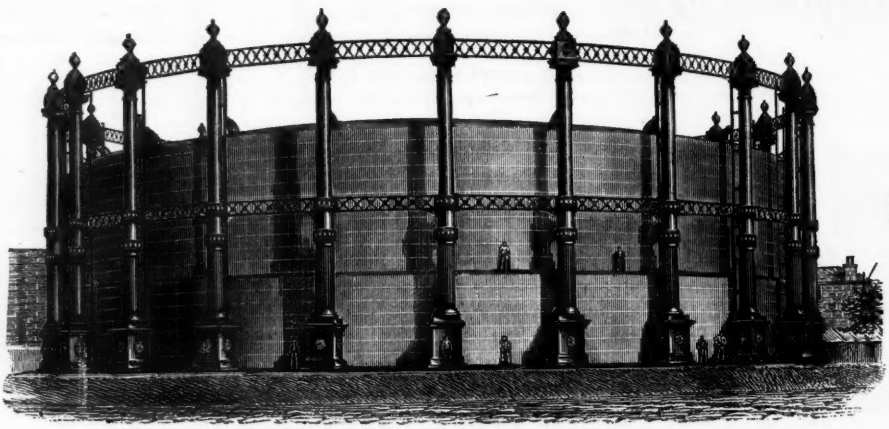
TELEGRAPHIC ADDRESS: "COCKEY'S FROME."

EDWARD COCKEY & SONS, Ld.,

ESTABLISHED OVER HALF A CENTURY.

GAS ENGINEERS, IRONFOUNDERS, & CONTRACTORS,

Manufacturers of GASHOLDERS and TANKS, BOILERS and ENGINES, ROOFS, EXHAUSTERS, BREEZE SCREENS, CHARGING and COKE BARROWS.



Manufacturers of PATENT WASHERS, PATENT VALVES for PURIFIERS, &c., GOVERNORS, LAMP COLUMNS, Weighbridges, COKE BREAKERS.

SOLE MAKERS OF COCKEY AND SMITH'S PATENT SELF-ACTING BYE-PASS VALVES.

Estimates for any description of Gas Plant on application.

THE IRON-WORKS, FROME SELWOOD, SOMERSET.

HIGHEST AWARDS—LONDON, PARIS, COLOGNE, VIENNA, MELBOURNE, AND OTHERS.

—11 MEDALS.—

MANUFACTURERS OF TUBES AND FITTINGS OF EVERY DESCRIPTION.

WROUGHT-IRON OR STEEL MAINS UP TO 6 FEET DIAMETER, FOR GAS, WATER, OIL, OR OTHER PURPOSES.

SCREWING TACKLE, BOILER MOUNTINGS, VALVES, COCKS, ETC.

LONDON: 108, Southwark Street.

BIRMINGHAM: 114, Colmore Row.

LEEDS: 6, Mark Lane, New Briggate.

THOMAS PIGGOTT & CO., BIRMINGHAM.

LONDON OFFICE: ST. THOMAS APOSTLE, E.C.

GAS PLANTS, BOILERS, ENGINES, PUMPS, ROOFS, RETORT FITTINGS, ETC.

TELEGRAPHIC ADDRESS: ATLAS, BIRMINGHAM.

WELDED & RIVETED PIPES, FOUL MAINS, RETORT-LIDS, & CAST TANKS, PURIFIERS.

OVER 500 GASHOLDERS HAVE BEEN SUPPLIED AND ERECTED,

INCLUDING THOSE SUPPLIED TO THE FOLLOWING GAS COMPANIES AND CORPORATIONS:

BATH.	BOLTON.	BRISTOL.	CHELTENHAM.	LEAMINGTON.	PRESTON.	SHEFFIELD.
BELFAST.	BOMBAY.	BRISBANE.	HARTLEPOOL.	LIVERPOOL.	READING.	STOCKHOLM.
BECKTON.	BRADFORD.	CARDIFF.	LEEDS.	NOTTINGHAM.	RIO GRANDE.	SYDNEY.
BIRMINGHAM.	BRIGHTON.	COVENTRY.	LEICESTER.	OLDHAM.	SOUTH METRON.	VIENNA.

GAS COAL.

BEST

REAL OLD SILKSTONE GAS COAL,

Address, THE STRAFFORD COLLIERIES COMPANY,

Near BARNSLEY, SOUTH YORKSHIRE.

NEWTON, CHAMBERS, & CO., LIMITED

THORNCLIFFE IRON-WORKS, near SHEFFIELD,

MANUFACTURERS OF

SLIDE VALVES, WITH RACK & PINION, OR Internal or External SCREWS, of all Sizes.

GASHOLDERS, AND Gasholder Tanks.

CAST-IRON RETORTS,

RETORT-BED FITTINGS,

And Retort-House Appliances

of every description.

Iron Roofs, Columns, Girders, Floor Plates and Tools, &c.

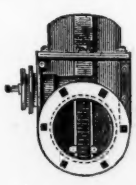
WROUGHT AND CAST IRON CONDENSERS, SCRUBBERS, & WASHERS,

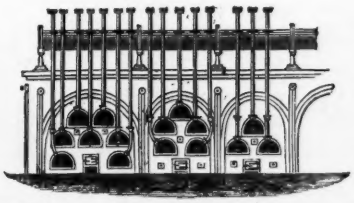
TAR AND LIQUOR PUMPS, &c.

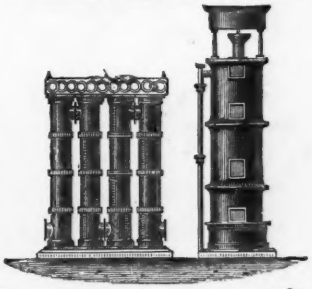
PATENT CENTRE VALVES

for working Purifiers.

Also Bye-Pass & Stop Valves.





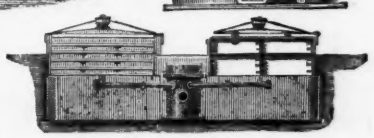


PURIFIERS with Planed Joints,

HAND and HYDRAULIC LIFTING GEAR, CAST-IRON MAINS and SPECIALS,

WOOD GRIDS.

CAST AND WROUGHT IRON TANKS AND CISTERNS.



DESIGNS, SPECIFICATIONS, AND ESTIMATES FREE.

Pig Iron (*Special Quality*) for ENGINE CYLINDERS, &c.

GAS COAL FAMOUS FOR ITS UNRIVALLED EXCELLENCE.

U of M

CROSSLEY'S "OTTO" GAS-ENGINE.

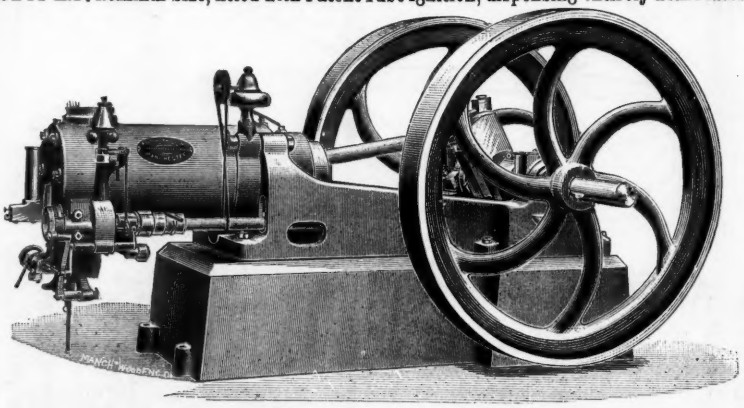
100 Prize Medals.

MADE in SIZES
2-Man to 100-HP.

GAS-ENGINES
COMBINED
WITH
PUMPS
FOR
TOWNS SUPPLY,
SEWAGE, &c., &c.

GAS-ENGINES
COMBINED
WITH
AIR COMPRESSORS
FOR THE
SHONE SEWAGE
SYSTEM, LUCIGEN
LIGHT, &c.

New 14-H.P. Nominal Size, fitted with Patent Tube Ignition, dispensing entirely with Plates.



MADE in SIZES
2-Man to 100-HP.

VERTICAL
AND
HORIZONTAL
TYPES.

ENGINES
COMBINED
WITH
HOISTS, PUMPS
DYNAMOS, &c., &c.

Largely used for
EXHAUSTING,
PUMPING,
COKE CRUSHING,
ELECTRIC LIGHTING,
&c., &c.

Over 31,000 "OTTO" ENGINES are at work.

CROSSLEY BROS., LTD., OPENSHAW, MANCHESTER,

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GLASGOW,
NEWCASTLE,
BIRMINGHAM,
HULL.

HARRIS & PEARSON,
STOURBRIDGE, ENGLAND.
MANUFACTURERS OF
FIRE-CLAY GAS-RETORTS, FIRE-BRICKS, LUMPS, & TILES of Every Description.
GLAZED BRICKS AND PORCELAIN BATHS.

LEAKY AND STICKING SLIDES
ENTIRELY AVOIDED.

EASILY MANIPULATED.

ESPECIALLY SUITABLE FOR PURIFIERS.

CUTLER'S PATENT WATER-VALVES FOR PURIFIERS.

LEAKAGE IMPOSSIBLE.

NEAT AND COMPACT.

NO DETERIORATION THROUGH
AGE AND FREQUENT USE.

IN USE AT NUMBERS OF LARGE WORKS, AND GIVING GREAT SATISFACTION.

SAML. CUTLER & SONS, Engineers,

GAS AND WATER WORKS CONTRACTORS.

WORKS:
PROVIDENCE IRON-WORKS, MILLWALL, LONDON, E.
Telegrams: "CUTLER, MILLWALL, LONDON." *Telephone:* 5059.

OFFICES:
16, GT. GEORGE STREET, WESTMINSTER, S.W.
Telegrams: "RETORTUS, LONDON," *Telephone:* 3223.

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JOSEPH CLIFF & SONS,

INCORPORATED IN
THE LEEDS FIRE-CLAY COMPANY, Ltd.,
WORTLEY, LEEDS.

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MACHINE-MADE RETORTS

Have been made in large quantities for the last twelve years; and during the whole of that time, have been in regular use at most of the largest Gas-Works in the Kingdom. They possess the excellent quality of remaining as near stationary as possible under the varying conditions of their work—a quality which will be appreciated by all Gas Engineers and Managers. The generally expressed opinion is that these Retorts are the very best that are made.

RETORTS CAREFULLY PACKED FOR EXPORT.

Fire-Bricks, Lumps, Tiles, &c., &c., of every description suitable for Gas-Works.

ESTABLISHED MORE THAN A QUARTER OF A CENTURY

WORKS HUNSLET, LEEDS

LONDON OFFICE: 60, QUEEN VICTORIA STREET E.C.

CLAYTON SON & CO. LTD.

MAKE A SPECIALTY OF GASHOLDERS

AND MAKERS OF GAS PLANT OF EVERY DESCRIPTION.

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THE WIGAN COAL & IRON CO., LIM^TD.,

Are exclusive Owners of the well-known HAIGH HALL & KIRKLESS HALL GAS COAL COLLIERIES, and supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, Cannel Nuts, &c.

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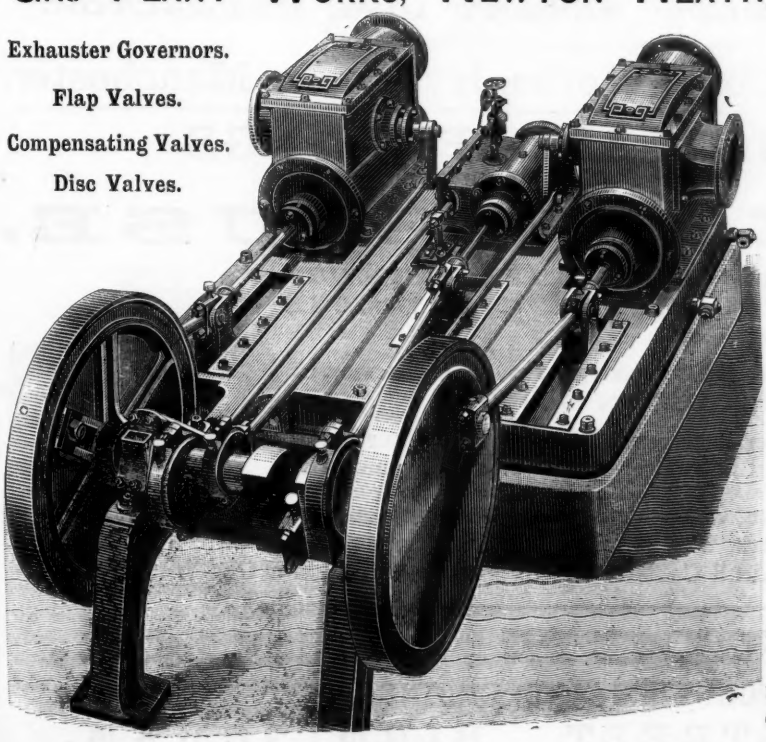
R. & J. DEMPSTER,

Engineers, Ironfounders, and Contractors,

GAS PLANT WORKS, NEWTON HEATH, MANCHESTER.

Exhauster Governors.
Flap Valves.
Compensating Valves.
Disc Valves.



GAS EXHAUSTERS.

COMBINED
Steam-Engine and Double-Cylinder
RECIPROCATING
GAS EXHAUSTERS.

These Exhausters work without oscillation, keeping a perfectly steady gauge.

They will force against the highest pressures without slip.

They are substantial in design. The working parts are finished bright, and are provided with large wearing surfaces to ensure durability, and being external, they are easily got at for repairs.

They are very economical in the consumption of steam.

The workmanship and materials are of the highest class.

They are made in all sizes, from 2000 feet per hour upwards.

Three of these Exhausters recently made by us are passing 60 million cubic feet of Gas per day.

JOHN HALL & CO.,

STOURBRIDGE,

MANUFACTURERS OF FIRE-BRICKS, LUMPS, TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

RETORTS CAREFULLY PACKED FOR SHIPMENT.

A STOCK OF DIFFERENT SHAPES ON HAND.

GAS AND WATER PIPES

AND

CASTINGS OF EVERY DESCRIPTION.

MANUFACTURED BY THE

CLAY CROSS COMPANY,

CHESTERFIELD.

TRADE	TELEGRAMS:	LONDON AGENTS:
C X C	"JACKSON"	BECK & Co.,
MARK.	CLAY CROSS.	130, GT. SUFFOLK ST., S.E.

SULPHATE OF AMMONIA.

By Her Majesty's Royal Letters Patent.

DR. FELDMANN'S APPARATUS.

The most successful and approved Apparatus known up to the present time.

FOR REFERENCES, PARTICULARS, TESTIMONIALS, AND PRICES APPLY TO THE

Sole Agents and Manufacturers,

GODDARD, MASSEY, & WARNER,

ENGINEERS,

NOTTINGHAM.

The Apparatus has been supplied to the following Firms—

BURT, BOULTON, & HAYWOOD, SILVERTOWN, and ELING.
CHANCE BROTHERS, OLDBURY (4 Apparatus).
RUNCORN SOAP & ALKALI CO., Limited, RUNCORN.
NETHAM CHEMICAL CO., Limited, BRISTOL.
ANIMAL CHARCOAL CO., Limited, SHADWELL.
WM. BUTLER & CO., BRISTOL.
KEMPSON & CO., Pye Bridge.

And to the following Gas Companies and Corporations—

ILKESTON.	BURY.	CHORLEY.
WIDNES.	BRIGHOUSE.	WHITEHAVEN.
HALIFAX.	MARKET HARBRO'.	CHESTER.
ALTRINCHAM.	PRESCOT.	SOUTH SHIELDS.
DENTON.	SOWERBY BRIDGE.	LEEK.
ST. ALBANS.	LEICESTER.	IPSWICH.
DUKINFIELD.	DARWEN.	BOURNEMOUTH.
NORTHWICH.	NELSON.	SALFORD.
HUDDERSFIELD.	ORMSKIRK.	LUTON.
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RUSCOE'S PATENT MACHINE

FOR DRILLING AND TAPPING WATER-MAINS AND GAS-MAINS UNDER PRESSURE.

Patent Saddle Back and Drilling Apparatus, whereby Gas and Water Mains can have 2-in., 3-in., 4-in., 5-in., and 6-in. Branches put on without loss of Water or Gas.

Sole Maker of HELPS' PATENT PIPE EXTRACTOR.

Prices and Particulars on Application to

JOHN RUSCOE, Albion Works, Hyde, near Manchester.

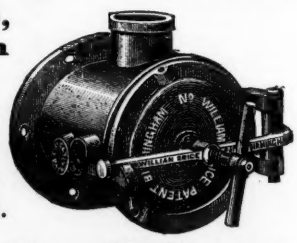
CASTINGS AND FITTINGS

FOR

GAS-WORKS USE.

Mouthpieces (Self-Sealing, GRICE'S PATENT), Rounds, D's, Ovals, D's to Round. Over 2000 in use.

Mouthpiece Castings, ordinary, in all shapes. Fittings for MORTON'S LIDS.



Charging Doors and Frames, Clinker Boxes and Lids complete, Cover Plates and Lids as used at Birmingham and Leicester, and by other Gas Companies.

Purifiers, planed Joints, and Lifting Gear. Ascension, Dip, Arch, and H Pipes. Fire Doors and Frames. Boshes, Deadplates, Bars, Tar-Boxes, Sight-Hole Boxes, Street Caps and Stoppers, Street Valve Boxes, and all Cast-Iron Requisites required in a Gas-Works.

W. GRICE & CO.,

IRONFOUNDERS AND ENGINEERS,

FAZELEY STREET, BIRMINGHAM.

KIRKHAM, HULETT, & CHANDLER, LIMITED.

[Mr. SIDNEY HERSEY, Managing Director.] ADDRESS AT FOOT. [Mr. J. CHANDLER, Engineer.]

416 Patent "Standard" Washer-Scrubbers,

Equal to a Daily Capacity of 374,700,000 Cubic Feet of Gas,

Erected and in course of construction at present date, amongst them being the following, viz.:—

(All new machines are supplied with improved wooden washing devices—"Bundles"—which can also be fitted to old Washers).

	Capacity. Cubic feet per day.
Altrincham	600,000
Adelaide	600,000
Aldershot	200,000
Allegheny, U.S.A.	1,000,000
Ashton-under-Lyne	1,250,000
Amsterdam	1,500,000
"	1,500,000
Annaberg	200,000
Arcachon	100,000
Animal Charcoal Co.	200,000
Altoona, U.S.A.	350,000
Buxton	250,000
Bradford	1,000,000
"	1,250,000
"	1,250,000
"	1,250,000
"	1,000,000
"	1,000,000
"	3,000,000
"	150,000
Bremen	1,000,000
Baltimore, U.S.A.	1,000,000
"	1,000,000
"	125,000
Balmain, N.S.W.	150,000
Bishops Stortford	400,000
Blackpool	1,250,000
Brussels	1,250,000
"	750,000
"	1,250,000
"	250,000
Banbury	5,000,000
Birmingham	2,500,000
Birkenhead	1,500,000
Blackburn	600,000
Bochum	250,000
Burntisland	2,000,000
Boston, U.S.A.	1,500,000
Brisbane	300,000
"	1,500,000
Burton-on-Trent	350,000
Barcelona	100,000
Barking	20,000
Baerlien & Co.	420,000
"	700,000
Bombay	550,000
Buffalo, U.S.A.	500,000
"	300,000
Brooklim, U.S.A.	250,000
Bergen	150,000
Berlin	1,000,000
Bournemouth	500,000
Bridgeport, U.S.A.	300,000
Brunswick	100,000
Beck & Co., St. Louis	600,000
Barmen Rittershausen	125,000
Bexhill	1,000,000
Brooklyn, U.S.A.	1,000,000
"	400,000
Brunner, Mond, & Co.	2 000,000
Cheltenham	200,000
Cannes	1,500,000
Croydon	200,000
Copenhagen	200,000
Clevedon	500,000
Columbus, U.S.A.	1,500,000
Cincinnati, U.S.A.	1,500,000
"	3,000,000
Chicago, U.S.A.	1,000,000
"	1,000,000
"	1,000,000
Chemnitz	1,250,000
Crewe	100,000
Colonial Gas-Works Co.	300,000
Cadiz	600,000
Charottenberg	750,000
Dudley	100,000
Driffield	500,000
Dukinfield	750,000
Dover	1,000,000
"	200,000
Deal	1,500,000
Derby	

	Capacity. Cubic feet per day.
Dublin	3,000,000
Dowlais	100,000
Douai	500,000
Denton	500,000
Derby, U.S.A.	350,000
Denver, "	500,000
" "	1,000,000
Düsselldorf	750,000
"	500,000
Dumfries	250,000
Dunedin, N.Z.	400,000
Darlington	1,250,000
Detroit, U.S.A.	750,000
Edinburgh	1,500,000
"	2,000,000
Enfield	300,000
Essen	300,000
Elbing	150,000
Falmouth	150,000
Frankfort	300,000
Farnworth	400,000
Fenton	400,000
Friedenshütte	500,000
Fürth	400,000
Freiburg	200,000
Goole	250,000
Glossop	300,000
Guildford	300,000
Gloucester	1,250,000
Gera	300,000
Grafton, N.S.W.	100,000
Grieg	300,000
Georgetown, U.S.A.	250,000
Gluckauf	200,000
Heywood	600,000
Holywood	125,000
Huy	70,000
Harrow	250,000
Harrogate	250,000
Halstead	150,000
Heilbronn	200,000
Havanna, Cuba	750,000
Hastings	1,500,000
Huddersfield	300,000
"	750,000
"	1,500,000
Hof	200,000
Hampton Wick	500,000
Heckmondwike	500,000
Haverfordwest	100,000
Halifax, N.S.	350,000
Hamm	200,000
Halle	400,000
Heidelberg	300,000
Hartford, U.S.A.	1,000,000
Ilkeston	300,000
Inverness	250,000
Ilkley	200,000
Ilford	100,000
Kingston-on-Hull	400,000
Kidderminster	750,000
Kidsgrove	100,000
Königsberg	1,000,000
King's Lynn	300,000
LONDON:—	
The Gaslight and Coke Co.:—	
Beckton	1,250,000
"	1,250,000
"	1,250,000
"	1,250,000
"	1,250,000
"	1,250,000
"	2,500,000
"	2,500,000
Silvertown	1,000,000
Bromley	2,000,000
"	1,500,000
"	1,500,000
"	1,500,000
"	2,000,000
"	1,500,000
Shoreditch	2,500,000

	Capacity. Cubic feet per day.
LONDON—*Continued.*	
Pancras	1,500,000
"	1,500,000
Pimlico	2,000,000
Nine Elms (2)	3,000,000
Kensal Green (2)	3,000,000
South Metropolitan Co.:—	
Greenwich	3,000,000
Woolwich	400,000
Vauxhall	3,000,000
"	3,000,000
Lea Bridge	300,000
West Ham	1,500,000
"	3,000,000
Leeds	2,000,000
"	3,000,000
"	3,000,000
"	3,000,000
"	3,000,000
"	2,000,000
Leominster	150,000
Leiden	560,000
"	600,000
Liverpool	2,000,000
"	2,000,000
"	2,000,000
"	2,000,000
"	2,000,000
" (3)	3,000,000
Lincoln	1,000,000
"	600,000
Lowell, U.S.A.	1,000,000
Laclede, "	1,000,000
Louisville "	1,500,000
Long Eaton	500,000
Lille	900,000
"	450,000
"	750,000
"	250,000
"	250,000
Luckenwalde	330,000
Liegwitz	300,000
Lincoln, U.S.A.	250,000
Lawrence, "	500,000
Lynn, "	300,000
Lyons	1,500,000
Maidstone	1,000,000
Marseilles	1,500,000
"	1,500,000
Mons	500,000
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"	2,500,000
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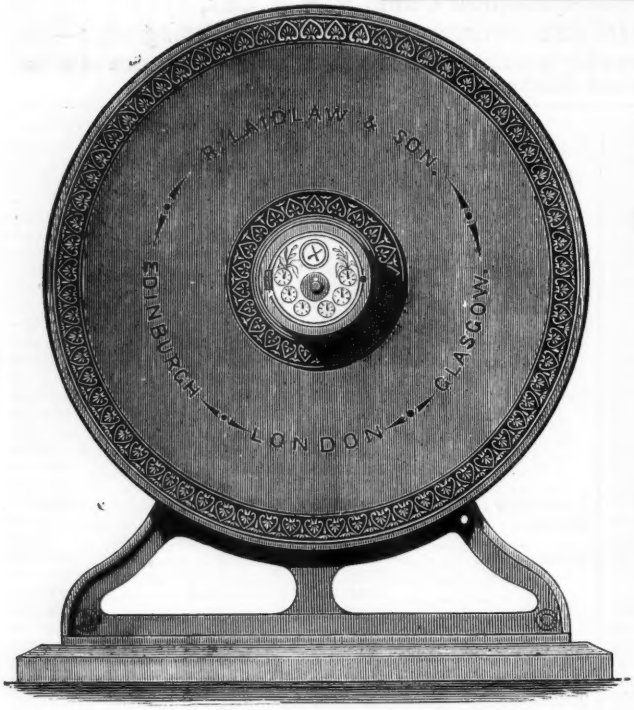

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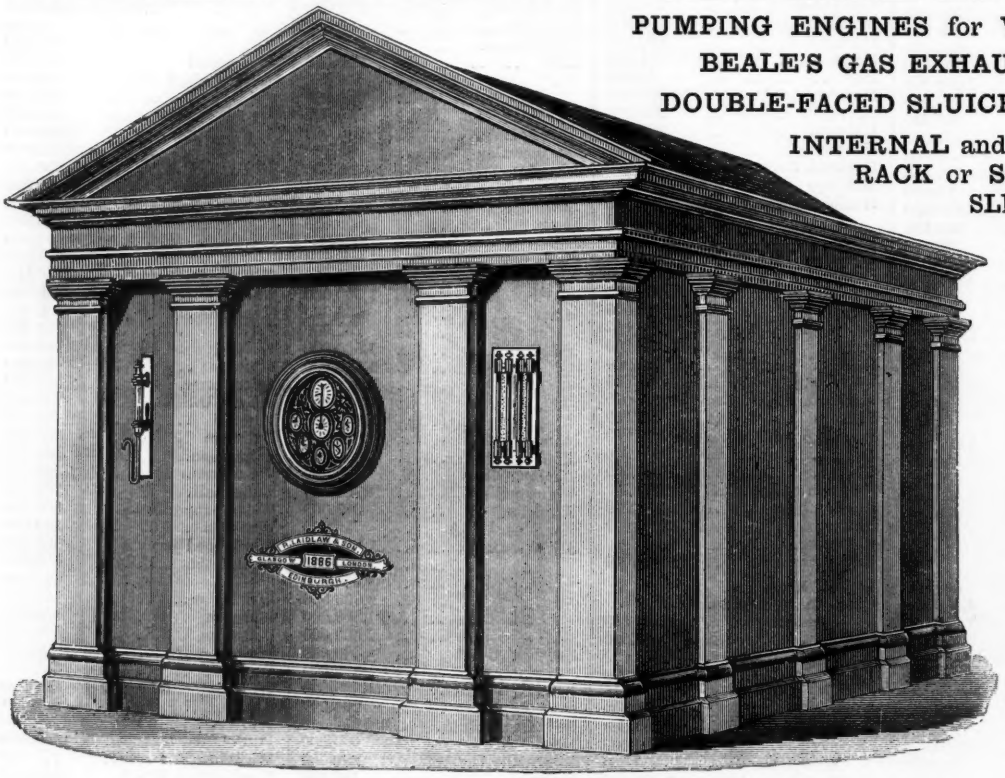

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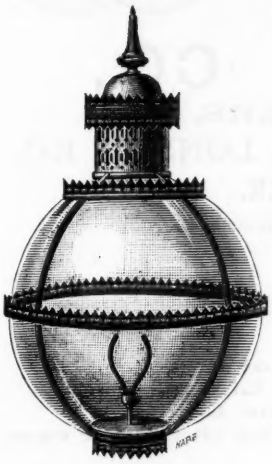

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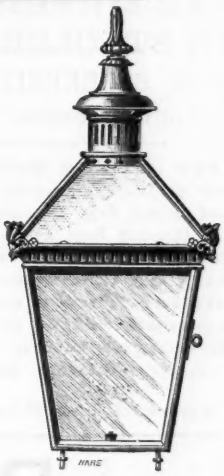

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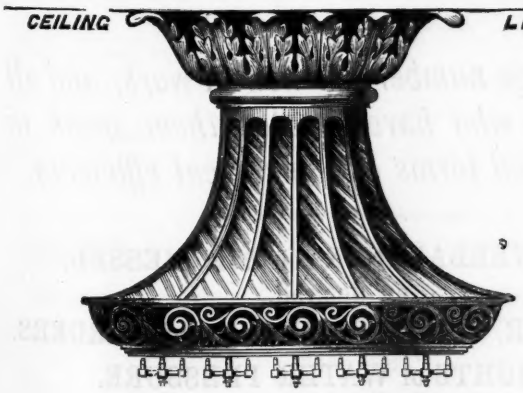

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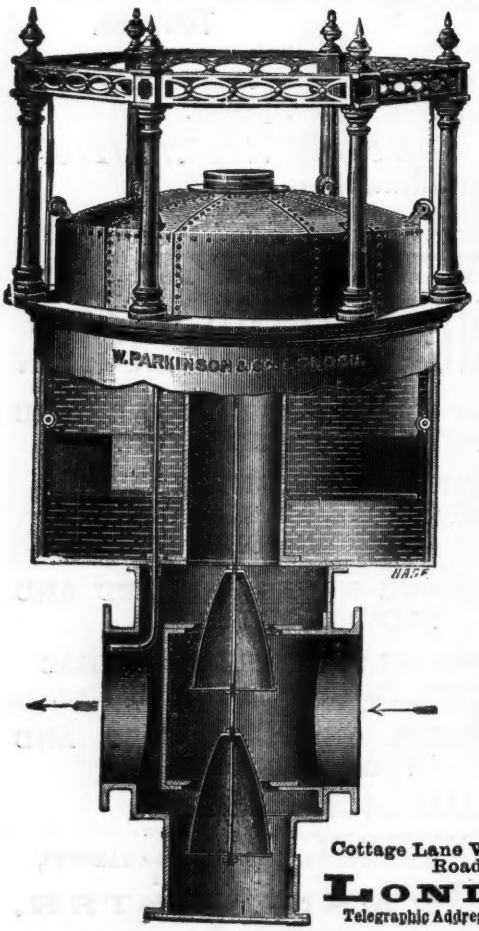

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[See also Advt., p. 105.

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THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JULY 21, 1891.

A Reviewer of the London Gas Supply.

IT is not often that the higher questions of gas supply, regarded as a branch of domestic or municipal politics, are discussed in newspapers or periodicals intended for general reading. London has no "gas question;" the subject of the supply of the great popular and commercial illuminant never appearing as controversial matter in the Metropolitan organs of public opinion. Now and again, casual reference to gas lighting is made in the London newspapers; but generally in connection with electric lighting, and never as a grievance needing investigation on behalf of the public. We should not like to assume the responsibility of stating that this indifference of the Press and of London "reformers" to the gas supply is ascribable to the widespread existence of anything like a competent knowledge of the self-acting conditions under which the supply of gas to the capital is carried on. Rather should we be inclined to think that the electricians have had something to do with this result. The newspapers and their readers have learnt that the only recognized rival of gas lighting in these scientific times is, as a matter of fact, considerably dearer than gas; and we believe that this impression, vague as it is, has had a good deal to do with quelling complaints of the price of gas in all parts of the kingdom, but especially in London. Consequently, when it is seen that a popular monthly like the *New Review* contains an article upon the lighting of London, in which attention is paid to gas as well as to electricity, the incident is worth noticing. We are naturally inclined to inquire why the subject of the gas lighting of London should occupy the attention of a magazine writer; and in this case the answer is easily found. The conductor of the *New Review* has suggested the idea of a Reformed London—a Model City—as an object for the aspirations of rational ratepayers and their representatives. His idea is not that of a glorified Boston, such as is prefigured in "Looking Backward," in which nobody is to have any breeches-pockets, for the simple reason of having no further use for them; but rather to expound what might be done, without upsetting the order of universal development, to make London a healthier, cleaner, and more pleasant place of residence and centre of business than it is. And in furtherance of this plan, while to Lord Rayleigh has been confided (with indifferent results) the task of discussing electric lighting, Mr. Edmund Vincent has essayed the presentment of the case for gas lighting.

We are unaware of the reasons for this choice, for Mr. Vincent's name is absolutely unknown to fame as an authority upon any branch of the gas industry; but we are not disposed to insist over much upon this point, except as a reason for examining closely the internal evidences which the essay supplies of the author's competence to deal with the subject. Whoever Mr. Vincent may be, so long as he speaks the truth about gas we will gladly accept him as a witness; for nothing can do more good to the gas industry than the bare truth, provided that a sufficiency of this is given. It is with much satisfaction, therefore, that we are able to admit, at the outset, that Mr. Vincent appears to have taken very considerable pains to get up his subject. His general appreciation of gas may be gathered from his statement that while he cannot find it in his conscience to describe it as a necessary of life, "most of us want gas to warm our houses, if not to "light our rooms; nineteen-twentieths of us in London "use it in some way, and the demand increases year by "year." His examination of the gas supply of London is chiefly directed to solve the problem whether this had better, in the supposed case of a Model City, remain in private hands or be acquired by the Municipal Government. In order to do this, Mr. Vincent begins by setting out the present position of the statutory Gas Companies; and while conceding that Parliament acted fairly in settling the terms of their respective sliding scales, he points to the actual price of the ordinary stocks of the two leading Metropolitan Companies as evidence that "Parliament "made too long a bargain" in these cases. He admits, however, that the consideration of the high dividends nominally paid by the Gas Companies under this arrangement does not justify the idea of "rescinding the bargain," because the original shares have changed hands, and the nominal dividends represent a very modest rate of interest upon the money invested by the present holders of shares upon the faith of the national promise. "A single breach "of the national faith in such a matter would have the "fatal effect of deterring men from investment; and is "therefore a thing not even to be suggested." Strangely enough, an independent writer arrives at this conclusion without requiring to be helped by the brilliant Bristol method.

So far Mr. Vincent is perfectly reasonable and fair; but after this point the weakness of the amateur shows through the thin draping of magisterial statement which is the

uniform of the magazine writer. He pauses awhile to explain how troublesome it is to find a solution for the "difficulty" he discovers in the fact that the parliamentary settlement of the London Gas Supply has eventuated in raising the value of gas stock, and admits that it would not be absolutely just to force men to sell out their investments even at a fair market price. But we take leave to enter a protest against the view that sliding-scale legislation is responsible for raising the value of gas stock. This is really traceable to the comparatively old sanction of 10 per cent. maximum dividends; and it is certain that if one of the London Companies referred to by Mr. Vincent had been left to carry on business to the present day under the old regulations, backed by the old guarantee, its 10 per cent. maximum stock would command as high a value as an investment as the actual sliding-scale stock. The reason for the high value of safe gas stocks in London, or anywhere else, must be sought outside gas legislation, and mainly in the depreciation of gold. It argues some narrowness in Mr. Vincent to overlook this factor of the problem; so we will put this query to him: "Given a "railway stock, or any other safe investment outside gas, "returning 10 per cent. dividend, what would be the "prices of £100 of such stock in 1841 and 1891, and "what would be the correct interpretation of the difference, "if any?"

Besides this failure to realize the true financial considerations bearing upon the value of gas stocks, Mr. Vincent is unable to understand the operation of the sliding scale. Moreover, he mixes up the two blunders in a style which is remarkable in its puzzle-headedness. He says: "The price of ordinary stock tends to increase "constantly. Why? Because the statutory price of gas "varies, roughly speaking, in proportion to the cost of "producing gas without reference to recently discovered "residuals; so that each new residual which is produced "in a merchantable form adds to the profits of the Gas "Companies without conferring any corresponding benefit "upon the public." And he goes on to talk about the South Metropolitan Company keeping a staff of skilful chemists in constant employment "to discover new things "which can be done with the residuals." It is amazing how anyone who has picked up so much that is true about gas supply as Mr. Vincent has evidently done, should fall into such a hopeless blunder as this. Where did Mr. Vincent learn that the value of residuals goes into a different cash-box from that which holds the gas-rental? Did he ever see a Gas Company's published accounts? Obviously not, or he would know that if diamonds were created in the tar-well their value would go to reduce the price of gas, and in a lesser degree to increase dividends. This is a terrible slip for a writer who professes to be able to explain gas-supply regulations to the people.

On the general question whether, supposing the London Gas Companies were bought out by a Municipality, the supply would be better managed, Mr. Vincent has an open mind, which has allowed him to go to Birmingham for an example tending to show that "a municipal body "can manage gas-works exceedingly well in spite of the "fact that the members of that body are chosen by the "electorate upon purely political grounds." Indeed, the political question seems to be the only difficulty that Mr. Vincent recognizes as standing in the way of the acquisition of gas undertakings by Municipalities. Perhaps, as old and constant observers of the working of the thing (not only in Birmingham, but all over the kingdom), we may be believed when we declare that Mr. Vincent's difficulty scarcely exists. It does seem a ridiculous idea, no doubt, that a man should be sent to help manage a corporation gas undertaking because he is a Local Optionist, or on some other equally irrelevant qualification; but practically there is little or no trouble on this score. Local Option apart, the chosen of his fellow-citizens is generally a sensible, respectable man, with some knowledge of business, and therefore as good as another person for looking after the administration of a gas undertaking. The great obstacle to the proper management of gas undertakings by municipal bodies is *Municipalism*. We mean by this term the tendency to separate the interest of the municipal organism from that of the community, to keep the ratepayers in leading-strings, and to favour the growth of a hide-bound officialdom in the town hall or the local board offices, which is plainly seen by its effects in many of our cities and towns. It is Municipalism which turns a gas undertaking into a milch-cow for the local authority, in order that all sorts of popularity-earning things may be done by the men in power, without the ratepayers feeling the cost. We might discuss at length the workings of Municipalism; but we forbear. Suffice it to say that, in missing this argument against the universal removal of gas supply from private to municipal ownership, Mr. Vincent again betrays the superficiality of his acquaintance with his subject. However, we have no great fault to find with his meaning; and when he has studied the gas industry more deeply, he may be able to write about it as informingly as he already can pleasantly.

The Judgment in the Intimidation Cases.

An important judgment was delivered last week in the Queen's Bench Division, upon the well-known Trade Union intimidation cases, which were taken together. A full report of the judgment will be found elsewhere. It was read by the Lord Chief Justice; but it gives the unanimous opinion of a strong Bench. There were three cases, the most important of which was that of *Curran v. Treleaven*—the Plymouth coal merchant's action. Our readers will remember the circumstances. As summarized by the Lord Chief Justice, "in order to prevent the em- "ployment by Mr. Treleaven of non-Union men, the three "Secretaries told him that if he did not cease to employ "non-Union men they would call off from their employ- "ment by him all the members of their respective Unions." Mr. Treleaven refused compliance; and so the men were called off. The question was whether this proceeding on the part of the Union Secretaries was intimidation within the meaning of the statute. The Plymouth Magistrates held that it was; and so did the Recorder. The Judges have been unable to agree with them. They carefully refrained from giving a definition of what is or is not intimidation in law; but they distinctly held that what was done to Mr. Treleaven, even if it amounted to injury in business, was not intimidation. It appears from this *dictum* that there must be personal injury, or the threat or reasonable expectation of it, to constitute intimidation. We are expressly told that a man, or several men, may design or concert measures having for their object the infliction of business injury upon another man; and unless "malice" can be proved, there is really no defence in the way Mr. Treleaven sought it. Until the law has been differently interpreted by a higher Court, or altered by statute, we shall loyally accept this judgment as conclusive. It is open to remark, however, that while this deliverance leaves the law of picketing in as unsatisfactory a state as ever, it marks a distinct advance towards the curtailment of the license assumed by some Trade Union wire-pullers. The Plymouth men have been justified because they distinctly repudiated and carefully avoided violence of any kind. When the inevitable mass meeting is held to celebrate this "great victory" of Trades Unionism, it is altogether too much to expect that the platform speakers will bear this cardinal fact in mind, and point the instruction for the benefit of their supporters. It would be as well, however, if they would remember, and act upon the reflection, that if the Judges refused to strain the law in respect of this Plymouth case, they would one and all be equally ready to apply its powers if instances of Trade Union rioting, such as that at Leeds and Bristol, were brought before them in the ordinary course of Assize business. The victory in the Plymouth case is not the victory of Trades Unionism, but the victory of peaceable, quiet method over tumult, riot, and disturbance.

A Question of Summary Jurisdiction.

A point of law has arisen in Lancashire in regard to the period for the institution of summary proceedings under section 23 of the Gas-Works Clauses Act, 1871, which, although it may not be strange to some of our readers, has not, to our knowledge, been discussed in the Journal. It appears that the local Gas Company recently wished to obtain summonses against some defaulters under the cited section; but the application was refused by the Magistrates' Clerk on the ground that the arrears were more than six months old. This fact, he asserted, barred proceedings; the refusal being based upon section 11 of the Summary Jurisdiction Act, 1848. An amicable controversy arose upon the point, which was referred to the *Justice of the Peace* for an opinion. The reply was to the effect that proceedings under section 40 of the Act of 1871 must certainly be taken within six months after the neglect

to pay the "rents, &c.," due; and that there is probably a similar limitation in the case of proceedings under the 23rd section. Now, reference to the Summary Jurisdiction Act, which prescribes the order of issuing and executing summonses and warrants, establishes the fact that it is enacted, by clause 11 of this statute, "That in all cases where no "time is already, or shall hereafter be, especially limited for "making such complaint or laying any such information in "the Act or Acts of Parliament relating to each particular "case, such complaint shall be made, and such information "shall be laid, within six calendar months from the time "when the matter of such complaint or information respec-"tively arose." This appears to settle the question. It certainly does so in the case of proceedings under section 40 of the Gas Act of 1871, which is included in the general classification of "Penalties;" and proceedings for the recovery of penalties are now regulated by the Summary Jurisdiction Acts. But the further question arises whether the matter referred to in section 23 is a "penalty." Obviously it is not; but what is the precise difference between the effects of section 23 and section 40? On the face of it, we should say that there is no difference as regards procedure, and that any Gas Company electing to proceed summarily under either section must submit to the condition ruling summary proceedings, of being commenced within six months of the time when the matter arose. Here again, when does the matter arise? When the amount, in a case of neglect to pay, becomes due. Assuredly, this is the only safe course to follow; and if, through any protracted negotiation, or for other reason, the six months are permitted to elapse, the amount in arrear must be recovered as a civil debt. Generally, therefore, we agree with the *Justice of the Peace;* but it would be interesting to learn if the point has ever been treated as doubtful.

The Supply of Gas for Motive Power, &c.

A RATHER important question respecting the liability of statutory undertakers of gas supply to damages for failure in keeping up a sufficient pressure to satisfy all the purposes of a consumer, has been tried in the Glasgow Sheriff Court. The plaintiff is a printer, and he claimed damages amounting to £7 12s. 8d. in respect that on Nov. 27 last year the supply of Corporation gas, which he was then using to light his business premises and drive his machinery, fell short without warning; stopping his work and putting him to considerable loss and inconvenience. The Corporation denied liability; averring that any deficiency of pressure on the day named arose from a sudden fog, occasioning an unusual and inordinate demand for light, which they were bound to look after first, whatever might afterwards happen to gas-engines. In short, the action turned upon the question whether gas suppliers are as responsible for keeping up a sufficient pressure to satisfy the requirements of gas-engines as for the ordinary lighting service. In the special case of Glasgow, there does not appear to be any statutory pressure enacted; but the Sheriff holds that since the Corporation are not only bound to supply gas, but also gas of a certain illuminating power, they must be regarded as under compulsion to supply at such pressure as will enable the gas to be burnt by any consumer to the effect prescribed. He declares, however, that "the Corporation are clearly "only bound to maintain a pressure which may fairly "be taken to be sufficient for ordinary circumstances. "They are not bound to provide for all exceptional "and unusual circumstances, and to keep up the same "pressure whatever be the state of the weather or the "sudden demands that are made upon them for lighting "purposes." In other words, a gas undertaking is under no statutory compulsion to perform impossibilities. Again, these remarks only apply to the lighting service, in connection with which the word "shall" appears in the statute as indicating the compulsory character of this service. In the case of Glasgow, and generally, statutory sanction for the sale of gas for non-illuminating purposes is given by the use of the word "may." As the Glasgow Sheriff observes, "everything is permissive;" and the Corporation merely occupy in this matter the *status* of an ordinary trader, who is not liable to any penalty or damages for ceasing to supply his customers without giving notice. The conclusions to which this legal functionary has arrived are that a consumer has absolutely no right to sue at all in respect of the stoppage of a supply of gas for non-illuminating purposes. In respect of gas for lighting purposes, a consumer cannot sue for damages if the gas is below the statutory candle power; but he can sue for the penalty provided in this case. In the case of insufficient pressure being given, even when no minimum pressure is, damages may be sued for in default of a stated penalty. "But the undertakers are only bound to keep up a reason-"able pressure; and any doubt must be given in their "favour." The plaintiff in the Glasgow case had failed to distinguish between his losses through want of light and those arising from want of power; and consequently the Sheriff stopped the action—stating, however, that if it had gone to trial the defendants' plea, that the defect of pressure was due to a fog, would have been a satisfactory defence. Altogether, this is a most useful judgment to bear in mind.

WATER AND SANITARY AFFAIRS.

THE report of Sir Matthew Ridley's Committee on the Water Supply of the Metropolis is felt to be a singularly disappointing document. The mountain has brought forth a mouse; and the great question remains very much where it was. Nobody seems any the wiser for all that the Committee have done; and certainly nobody appears to be contented. Perhaps within the limits of the London County Council certain gentlemen will be found to realize a kind of opportunity arising out of the report, and will exult in the proposal that, whereas the Select Committee have failed to arrive at a practical conclusion, the County Council shall now take the matter up, and define "the policy which, for financial and other reasons, it is "desirable to adopt." But, as remarked by *The Times*, it is "improbable that Parliament will efface itself to the "extent which the Select Committee suggest." If the Committee had not taken shelter in the first instance behind the report presented to Parliament by Sir William Harcourt's Committee—thereby shutting out all evidence in favour of leaving the supply in the hands of the Water Companies—they would have been in a far better position to grasp the whole question. After having determined, as an infallible and incontrovertible proposition, that the water supply of the Metropolis should be in the hands of a responsible Public Authority, the Committee proceed in their report to consider an exactly opposite conclusion—recommending that, "in the event of the "undertakings of the Companies not being acquired by "purchase," there should be a parliamentary inquiry "into "the statutory powers and obligations of the Water "Companies;" and it is suggested that "it might possibly "be found advantageous" to make the present obligations, as well as the official control of the Companies, "more "complete." Thus Parliament and the public are presented with a sort of "do-as-you-like" report; but when the question is asked as to what ought to be done, the Committee reply, in effect, "Ask somebody else." The House of Commons is perhaps a little astonished to find that, whereas the Select Committee had power to inquire into everything, certain vital questions relative to the water supply "naturally form a part of the complete in-"quiry which it will be the duty of the London County "Council to conduct."

The only portion of the Select Committee's report characterized by any distinctness, is that which accompanies the proposal for the County Council to have power to conduct the inquiry which the Committee themselves were expected to carry out. It is recommended that, if the Council resolve on such a course, they shall have power to promote a Bill in Parliament constituting themselves the responsible Water Authority for London, acting through a Statutory Committee of the kind already proposed. If constituted the Water Authority, the County Council, it is said, "should be required to purchase," either alone or in conjunction with some of the authorities of the outside areas, the undertakings of the eight Water Companies, either by agreement or by arbitration, and "within a fixed period." But all this is hedged about with so much of "inquiry," that it is difficult to know what is really intended. We are ready to make allowances for the Committee. We never thought them a very strong body; and we are not surprised to find them charged with "weakness and indecision." They had been wiser, perhaps, had they presented an interim report, and asked leave to sit again next session. They might have touched

firmer ground next year. But, unfortunately, they crippled themselves at the outset with a foregone conclusion. The real difficulty which creates a stumbling-block in this question is the idea, presented in the report of Sir W. Harcourt's Committee, that the Water Companies are to be got rid of. To turn the Companies to better account forms no part of the considerations entered into by Sir Matthew Ridley's Committee, except that it may be made the subject of a parliamentary inquiry "in the event" of the undertakings not being purchased. But why is the question thus narrowed? We have already commented on the argument used by Mr. Pember before the Select Committee, that the amalgamation of the London Water Companies would be found fraught with advantage to the public. This view of the case was put with much force by the learned Counsel, and perhaps had something to do with bringing about that proposal in the report to which we have adverted, as to the course to be pursued supposing the undertakings were not purchased. It is to be regretted, for the sake of the Companies, that they have not amalgamated; and it is also to be regretted in the interest of the public. Economy in the management of the supply would be accomplished, and some important engineering advantages might be secured. Mr. Pember further showed how extensive already were the powers of control. The subject is one on which the public are by no means well informed; and if the facts had been distinctly put forth in the report of the Committee, some useful information would have been furnished. As it is, we are referred to "a memorandum in the appendix," where the facts will be carefully entombed.

One result, unexpected in its nature, may perhaps arise out of this unwelcome report. A feeling of irritation may ensue at the prospect of interminable "inquiries." One of our contemporaries says: "There is no city in Europe "that can display so many reports about water as "London." Yet we are to have more of these reports, and mountains more of evidence. Is there no short road to the end of this story? We venture to say there are two. One is to recognize the Companies as forming part of the best system for supplying water to so large and exceptional a community as that of London and its suburbs. Amalgamation and more perfect control may be associated with this principle. Another method is to decide at once upon buying up the undertakings, and extending the works as far as may be found desirable. Such was the proposal of the Royal Commission in 1869; and it provides a sort of alternative to the plan of amalgamation and control. The failure of Sir Matthew Ridley's Committee is in reality due to the circumstance that the subject has been approached from the wrong point of view. So long as this is the case, "inquiries" and reports will continue their profitless course. The first step which follows the appearance of this report, is an attempt on the part of Sir John Lubbock to obtain the passing of the Bill which he introduced some time ago, conferring power on the County Council to promote Bills affecting the Merropolitan Water Supply. The fact is that the report of the Select Committee, so far as it proposes anything, is an echo of the views propounded by the witnesses for the County Council.

South Pelaw Colliery.—A few days ago the sinkers at this colliery reached and pierced the Busty seam, which turned out to be of a very superior quality, and 5 ft. 6 in. thick. This was the original Pelaw Main pit, and was formerly worked under that name by the late Earl of Durham, who, however, took out only a portion of the Hutton seam. The royalty is now leased to a private Company, and is under the management of Mr. T. Gilchrist, Mining Engineer, who, we learn, intends working it up to an output of 2000 tons daily, at which rate it is estimated the colliery can go on for from 80 to 100 years.

Society of Chemical Industry.—A large number of the members of this Society attended the annual meeting recently held in Dublin, under the presidency of Mr. E. Rider Cook. According to the report of the Council, which was read by the Secretary (Mr. C. G. Cresswell), the members on the register were 2697, as compared with 2595 at the previous meeting. In the past session, 77 papers appeared in the Society's *Journal*, against 87 in the preceding year. After a brief statement of the financial position of the Society, the President delivered his address, in which he expressed a hope that the mineral wealth of Ireland would be soon utilized. He showed that already there are examples of successful industrial enterprises in Ireland; and said he did not doubt that the training now available for those who wished to devote their energies to chemical studies would in the future bear fruit in the industrial progress of the country.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 133.)

ANOTHER depressed and depressing week in the Stock Markets has passed, with an almost general falling away of prices. The sinister influences are to be found at home as well as abroad. The declaration of reduced railway dividends, the result of dearer coal and labour, has been the feature here; while further Argentine troubles have been the principal foreign factor. The suspension of the English River Plate Bank just at the close was the culminating point of the week; and it is quite possible that the mischief may not be stayed here. The sudden hardening of the Money Market, owing to a somewhat unexpected withdrawal of gold, has also had its effect upon prices. Business still continues to be much restricted, and it is likely to remain so; for there is nothing in the present prospect of affairs at all calculated to promote the restoration of confidence. The Gas Market has not been particularly active; but it has been very firm, as a rule. The chief feature was the advance of Gaslights on Saturday, after the public notification that the dividend would be at the same rate as the last—viz., 13 per cent. There had been in some quarters a slight degree of uncertainty as to whether the Company would be in a position to maintain their dividend this half year; and the anouncement was a welcome solution of the doubt. Apart from the £385,000 reserve fund which the Company still possess, it is known that the past six months have brought a considerable increase of business to this and to other kindred companies; and although the net profits must not be expected to come out as high as heretofore, owing to the increased charges for labour and material, yet the result of the working will probably give general satisfaction. South Metropolitans, though not largely dealt in, were strong enough to continue the rate of progress which they have made for some weeks past. A small quantity of Commercial old changed hands at better than average figures; but the new was put down 5 for some reason or other—no business being done in it. The Suburban and Provincial undertakings were wholly unnoticed. The Continental Companies were in good favour with advances effected in Imperial Continental and Continental Union, and European standing well on *ex div.* adjustment. The only other change was a fall of ½ in San Paulo. There were a fair number of transactions in Water, at moderate figures; but Chelsea was more freely offered.

The daily operations were: Business in Gas was quiet on Monday. Good prices were realized generally; and South Metropolitan "B" rose 1. The market on Tuesday was in the same form; everything dealt in being very firm. South Metropolitan "A" rose 2. There was a slight shade more activity on Wednesday; quotations remaining firm and unchanged. The tendency was still the same on Thursday. Gaslight "H" rose 2; but San Paulo fell ½. Friday did not present any particular feature. Prices throughout were good; and Continental Union preference advanced 1½. Saturday furnished more incidents than any other day. Gaslights advanced generally; the "A" rising 2, and the closing bargain being at top price. "H" also rose 2; and the 10 per cents., 1 each. Imperial Continental also improved 1. The adverse movements were a fall of 5 in Commercial new, and of 2½ in Chelsea Water.

ELECTRIC LIGHTING MEMORANDA.

Mr. W. H. Preece's Address Criticized by Electricians—Lord Rayleigh on the Lighting of London—The City of London Electric Lighting Company.

ON the whole, gas engineers have no reason to be disappointed with the treatment that Mr. W. H. Preece's address to the Municipal Engineers has received at the hands of critics who must be credited with strong leanings towards electricity. Not a single protest has been raised against Mr. Preece's ridiculous figures by any of the champions of the gas industry who have aforetime deemed it necessary to correct, upon their personal authority, misrepresentations which they feared might work injury to their own side. Can it be said, in all sobriety, that the statements of such an eminent person as the Chief Electrician to the Post Office are not considered worth contradiction? So it appears; and the neglect which Mr. Preece has experienced is the greatest disparagement that could be offered to him and his cause. Our contemporary *Engineering* has all along favoured electric lighting; but it shakes its editorial head over Mr. Preece's advocacy. It adopts his view of the efficiency and cost of gas lighting as ordinarily used; but it cannot be brought to see why, in a *pseudo*-scientific comparison of two systems of lighting, the selected data should be the retail price of the one and the cost price of the other. Consequently, it cannot state the cost of electric lighting to the ordinary consumer in London at less than an advance of 230 per cent. on the cost of equivalent gas lighting. We notice also that, in commenting upon the charges of the London central supply companies, *Engineering* follows our view that the mere stoking or cost of fuel is a very small factor in the expenses of such concerns. "Their revenues are depleted by their machinery and mains working under an extremely low load-factor, and by

the very expensive superintendence necessary to keep everything going properly." But the most outspoken condemnation of Mr. Preece is meted out by the *Electrical Review*, which tells him "there is no good cause served by manufacturing half-truths in any new industry." Time was when to be publicly convicted of telling half-truths would have been fatal to the reputation of a man of science; but we seem to have altered all that.

A short article on electric lighting, written with reference to the imaginary requirements of a model, or reformed, London, has been published by Lord Rayleigh in the *New Review*, whence with the companion article referred to elsewhere, it will probably travel far. Anything that bears the signature of Lord Rayleigh is *primâ facie* deserving of attention; for he at least has not yet mixed the matter of a man of science with the style of a commercial traveller, like so many of the prophets of electricity who provide "scientific" copy for our newspapers and magazines. In the article in question, Lord Rayleigh conveys to the reader in the fewest and clearest words a sufficient idea of the nature of arc and of incandescent lighting; but when he leaves the purely scientific, and enters upon the economical and social sides of his topic, he is content in many respects to echo the phrases of a Hammond or a Preece. What, for instance, can such a man as Lord Rayleigh mean by stating that the Electric Lighting Act of 1882, "in the supposed interests of the community, threw such impediments in the way of enterprise as to cause London to fall into the rear of American villages and distant islands of the Pacific." Would his Lordship really and truly be content to see the West-end of London handed over to the tender mercies of electric light speculators, as American towns are? There is not much more in the article which, by the way, seems to favour the direct in preference to the alternating system of supply. It is remarkable chiefly for the illustration it furnishes of the wisdom of the old saw which recommends the cobbler to stick to his last. Lord Rayleigh is in his place in a physical laboratory; but his experiences there do not qualify him for pronouncing upon town lighting.

There has been a galvanic movement of the dead body of City speculation during the last few days. A few new Companies have been put upon the market; but it is doubtful whether there is any real business to be done. Prominent among the crop is the City of London Electric Lighting Company, which has been enthusiastically welcomed by some of the "financial" newspapers. These publications have been under sore discouragement for some time, owing to the lack of demand for those displayed advertisements of "new issues" in which their proprietors take so great a delight. Moreover, when the subjects and length of editorials is so accurately adjusted to the style of the back page, what is one to do when the page goes begging week after week? However, the new electric lighting venture has risen upon the financial horizon; and financial journalism rejoices accordingly. It is rather a big thing, with a share capital of £800,000, of which £400,000 is asked for to begin with. There is a somewhat heavy-looking Board; and the prospectus is artfully drawn. This Company is the first-fruit of the City of London Electric Lighting (Pioneer) Company, which was the outcome of contracts for street lighting placed by the Commissioners of Sewers with the Brush Company and the Laing, Wharton, and Down Syndicate. There must be some very complicated points in the contracts and agreements between all the different parties to this City lighting business, which will in all probability rejoice the hearts of the lawyers in good time. At least seventeen contracts are specified in the new Company's prospectus; and the whole undertaking is overshadowed by the Provisional Orders for the City of London, which apply to the undertakers a modification of the sliding-scale principle of gas legislation. Curiously enough, the drafters of the prospectus had to go to Berlin for the only available example of an Electric Lighting Company doing a profitable business; but it is not stated whether this rare specimen enjoys the privilege of inheriting its district at two or three removes from the original contractors. On general principles (which are largely dealt in by the prospectus), it might be held that an Electric Lighting Company, enjoying good street lighting contracts, ought to do pretty well in the City of London. But the prospects of any undertaking of the kind must depend upon the financial burden, more than upon any other consideration; and it appears as though everything had been done to load this particular scheme with capital and with legal risks.

Title and Index to Vol. LVII.—The title-page and index to Vol. LVII. of the JOURNAL (January to June, 1891) are now ready; and, as usual, a copy will be forwarded post free by the Publisher, on receipt of a post card from any subscriber.

Death of Mr. A. Penny, M. Inst. C. E.—We regret to record the death, on the 7th inst., in his 51st year, of Mr. Alfred Penny, M. Inst. C.E., Executive Engineer, D.P.W., India, eldest son of the late Mr. Alfred Penny, of Beckenham.

New Standing Orders relating to Water Supply.—Mr. Hastings, the Chairman of the Select Committee on Police and Sanitary Bills, will, on Thursday, move two new Standing Orders, entitling the Council of any administrative county alleging in their petition that such county, or any part thereof, may be injuriously affected by the provisions of any Bill relating to the water supply of any town or district, whether situate within or without such county, to be heard against the Bill.

INTERNAL-COMBUSTION ENGINES.

GAS engineering touches mechanical engineering in many points but in none are the true conditions of a tangent of the two spheres of engineering activity more plainly presented than in respect of the application of gas for the production of motive power. Students of geometry know that a straight line drawn through, and therefore, in geometrical parlance, uniting, the centres of two spheres in mutual contact, must pass through the tangent; and this line is the shortest way from centre to centre. So in the case of mechanical engineering, the common interest which both branches of science have in the development of the gas-engine is the strongest bond between them. The responsibility of the gas engineer with regard to this development is in reference to the production of the gaseous fuel required for this order of motors at the lowest price and in the best condition for the work expected of it; that of the mechanician is in respect of the construction of a machine to give the best results from the fuel consumed. It is desirable to keep this division of responsibility constantly in mind; for it is frequently in danger of being misunderstood. Instances have been known of gas companies being induced to subsidize inventors of gas engines, on the plea that the success of the latter would conduce to the prosperity of the former. We have no hesitation in stigmatizing this procedure as unjustified. A gas company have no more warrant for financially assisting a maker of gas-engines, even to the limited extent of furnishing a gratis supply of gas for his experiments, than they would have for subsidizing a designer of coal-getting machinery. Both kinds of mechanical advancement might be said to benefit a gas company; but both belong to the realm of mechanics, and not to the domain of the gas engineer. While thus insisting upon the independence of gas and mechanical engineering in the matter of the production of gas-engines, it is easily demonstrable that gas engineers, by making cheap gas, can inspire mechanicians with hope for the commercial success of good gas-engines; while on their side the mechanicians, by improving their motors, can make them more and more worth the attentive consideration of gas manufacturers.

During the last year, the lapse of the original Otto patent has thrown the well-known "Otto cycle" open for the adoption of all mechanicians; and accordingly there has been something like a rush of ingenious persons of this description, all bent upon demonstrating that their method of deriving motive power from gas treated upon the Otto principle is superior to that of the original makers of this type of engine. It does not appear that they have been altogether successful in the attempt; but this by the way. A most notable result of the influence now in question was the great increase in the number and variety of the gas and petroleum engines exhibited at this year's show of the Royal Agricultural Society. Our engineering contemporaries remarked that the display of gas-engines on this occasion was the largest ever seen at any show, or indeed at any exhibition; and if the local conditions had been more favourable, the collection of motors designed to work with gaseous fuel might have made a greater noise in the industrial world than was actually produced. It is only right, however, that we should place upon record the fact that Doncaster, this year, proved that those who need gaseous-fuel motors for any purpose have at last a wide range of choice among reputable makers, all employing the principle which has been found to be the most advantageous yet tried for converting combustible gas into power. When to the once-monopolist firm of Crossley Bros., Limited, are added such makers as Messrs. Fielding and Platt, of Gloucester, Messrs. R. Hornsby and Sons, Limited, Messrs. Priestman Bros., Limited, Messrs. John Taylor and Sons, of Nottingham, and Messrs. J. E. H. Andrew and Co., of Redditch—to omit many equally good names—it becomes obvious that the days of "Hobson's choice" in gaseous or liquid fuel engines have departed. The Otto patent has been a magnificent property—better than we expect to see again in this connection until somebody invents a practical hot-cylinder engine; and now the world will have the chance of witnessing what competition will be able to make of the celebrated cycle.

One result we certainly expect to see, and that is the virtual disappearance from the market of the numerous small fry of non-compression gas-engines which have been such a conspicuous feature of shows and exhibitions. These motors consumed more gas in doing their work than the Otto engines. But, on the other hand, they were cheap; and, for small powers, a little more gas was not of much moment in comparison with a low-priced machine. It is hardly to be expected that the Otto cycle will rule the day, especially as there are other cycles into which compression duly enters, which the designers maintain are superior to the "three-to-one stroke." But there can hardly be any doubt that the Otto principle will be the most generally used by those makers (who bid fair to become very numerous) who will lay themselves out to create trade by placing strong, well made and finished engines upon the market at reasonable prices. Over and above this general bid for patronage, there will be plenty of scope, as was seen at Doncaster, for eye-catching modifications of governors, valves, igniters, and other details.

Gas engineers will make a grave blunder if they take it for granted that all this expansion in the gas-engine trade necessarily implies increased reliance upon coal gas as the source of power for the general order of internal-combustion motors. For the classes of gas motors mainly employed for town use, the

makers undoubtedly depend, as a matter of course, upon coal gas. But great as must be the aggregate demand for it in this connection, it is clearly defined in individual examples. Writing under correction, we have no evidence to show that coal gas motors exceeding 50-horse power indicated are in much request. At Doncaster, as elsewhere, the gas-engine makers had, with common consent, confined their productions to engines of considerably less than this commercial maximum size. The reason for this is plain. If a town manufacturer or tradesman wants small power for his business, he begins with a 4, 8, or 16 horse power gas-engine; and in course of time he may put down a second. If, however he wants 50-horse power or so at the start, he never thinks of gas-engines, but lays down steam plant at once. Yet, as we have had occasion to record, effort is being made to perfect gas engines of larger size than this, worked by producer gas. It comes to this, therefore, that even with coal gas at the average English price of 2s. 6d. per 1000 cubic feet, or thereabouts, gas-engines have already reached their maximum commercial development, in point of size. But it is not to be assumed that there is no effectual rival with coal gas for engines of small size. The petroleum oil and spirit engines at Doncaster were very much in evidence; and the circumstance that Messrs. Crossley Bros., Limited, exhibited a motor of this kind, may be taken as strong proof of the existence of a demand for such machines. The Crossley motor is called an oil-gas engine; but, of course, the oil gas is made by the engine itself. This is not the simplest engine on the market, however; some others—notably the Hornsby-Akroyd model—being very remarkable on this score. A great stride in advance has been made by designers of petroleum engines since Messrs. Priestman set themselves to develop motive power from common lamp oil. This is now an old story; but the future of such motors can hardly be described as having fairly opened yet. It would be a good thing if the ordinary gas-engine could be fitted with an oil-gas attachment at small expense, so as to work with either gas or oil. But possibly purchasers would not care to buy such an extra fitting if they could get it, although they might be glad enough to borrow anything of the kind in case of an emergency due to a stokers' strike.

It is another piece of evidence tending to illustrate the desire of the Council of the Society of Arts to keep their proceedings abreast of the times, that, just at this juncture, when there is so much bustle in the crowd of machinists interested in the internal-combustion engine, the Society have had a paper from Professor W. Robinson on the uses of petroleum in prime motors. This paper contained a good deal of miscellaneous information on the subject of illuminating and fuel oils; but the most original part of it was the report of the practical working efficiency of different makes of oil-engines. Thus we learn that a Priestman engine, developing 8½ indicated horse power, consumes oil after the rate of 0·7 pint per indicated horse power per hour. The oil used was the so-called Royal Daylight brand of the American Oil Company; and it sells in bulk at 5½d. per gallon. When the oil is vaporized in an apparatus forming part of the engine, a duty of 1 brake horse power per pint of oil of between ·840 and ·854 specific gravity seems to be good average working. For large engines of more than 30 to 40 horse power, however (supposing them to be marketable), Professor Robinson advocates that the oil shall be previously gasified in any suitable apparatus. We suspect, however, that not very many such engines are likely to find purchasers under existing conditions, and that the economical circumstances of the coal-gas engine are reproduced in the oil-gas motor. There is another point: Electricians are fond of claiming that gas used for the production of power in an engine, and so made available for driving electric light machinery, will give a higher candle power per unit of quantity than if burnt directly for the purpose of lighting. Hence it is argued that gas must take an inferior place as an economical illuminant. It appears, however, that if such a remark can be made with reference to gas, it might be capped in respect of oil, which is thus demonstrated to be capable of generating very much more light through an oil-gas engine than when burnt in lamps of the ordinary pattern. It is not easy to express this part of the oil-engine question with perfect accuracy, because there is great doubt as to what ought to be taken as fair electric-lamp and oil-lamp performances respectively. Anyhow, a horse power of energy must be far superior, as a means of producing light, to a pint of oil in a lamp. Therefore, according to the favourite argument of electricians, oil ought to be nowhere in the artificial light market; but we know, as a fact, that it is very much to the fore. We conclude from this—and take liberty to extend the argument to gas—that it is impossible to settle the commercial and industrial fortunes of a means of lighting solely on the ground of theoretical efficiency.

This brief statement of the condition of contemporary gas and petroleum engine practice does not pretend to be exhaustive of the subject; but it would be neglect of a significant sign of the times if the present position of internally-fired engines were to escape representation in the pages of the JOURNAL.

The Gaslight and Coke Company's Dividend.—The Directors of The Gaslight and Coke Company will recommend at the forthcoming general meeting, a dividend for the past half year at the rate of 13 per cent. per annum.

NOTES.

The Storeage of Petroleum in Gas-Works

The difficulty that has occurred to many gas engineers respecting the storeage of large quantities of petroleum upon works where water gas is made, has inspired Mr. Frederick A. Sabbaton, of Troy, New York, to take out a United States patent for a method of combining oil with gas storeage. Mr. Sabbaton's device is a very simple one; consisting in the construction in that part of an ordinary gasholder-tank which is commonly called the "dumpling," of a sheet-iron vessel intended to contain the liquid hydrocarbon. Connection is established between the inside of this vessel and the water in the tank, in order that it may always stand full of one fluid or the other. There are also the necessary supply and draw-off pipes, by means of which the oil may be pumped into the enclosed vessel, expelling the water, or *vice versâ*. The patentee's claim is for the combination, with the outer tank containing water, the gasholder sealed by the water in the tank, and moveable upward and downward therein, and means for introducing gas into, and discharging it from the holder, of the stationary closed vessel for hydrocarbon liquid immediately surrounded by the water in the tank, and within the circuit of, and covered by the holder, and having an open passage for water between the outer tank and the lower part of the interior of the stationary closed reservoir with the oil inlet and outlet pipes. There is this to be said for the idea of storing oil under the water inside a gasholder-tank—that, in the event of a leak in the top part of the vessel, no harm would be done, because the oil would merely rise to the top of the water inside the holder; while if water is admitted to the bottom of the oil reservoir, any leakage from that part would be of water only.

New Phenomena in Light and Heat.

Two striking effects in lighting, and in the conversion of heat into motion, were recently shown at a meeting of the Royal Institution. These were the induction lighting of Professor J. J. Thomson, and the pyro-magnetic heat-engine of Mr. Shelford Bidwell. Professor Thomson had prepared a number of vacuum tubes in which there were no electrodes, but which were surrounded by coils of insulated conductors, connected with batteries of Leyden jars. These tubes contained a little gas, of sorts, remaining after they had been exhausted in the ordinary way; and every time the jars were discharged through the surrounding conductors, the insides of the tubes would be filled with light, which varied in colour with the kind of gas contained therein. A Wimshurst influence-machine furnished the electricity; and the display was an exemplification of the connection between induced electricity and the phenomenon of light, which in this instance had no relation to combustion. Mr. Shelford Bidwell's heat-engine depended for its action upon the fact that nickel is magnetic at ordinary temperatures, but at 300° C. becomes suddenly non-magnetic. A slip of nickel attached to a disc of copper was suspended by two strings, so that it could swing like a pendulum. On one side of the hanging metals was a magnet, with which the piece of nickel was ordinarily kept in contact, and held by it. By placing a gas-flame or a spirit-lamp underneath the nickel, so as to warm it, it became so heated as to lose its magnetism, or power of being magnetized, and fell off—the pendulum thus making a swing. By its passage through the air, the nickel was cooled below the critical point, and on returning was held again by the magnet, only to fall off again as before; and so on, with considerable regularity, so long as the source of heat was kept up. This was a pretty lecture-table experiment.

Diagrams of Scantlings of Iron Joists.

Mr. W. Dunn, A.R.I.B.A., recently published in the *Builder* a couple of useful diagrams intended to save the labour of calculation in determining the sizes of rolled-iron floor joists, and the necessary sections of cast-iron stanchions. Now that architects are turning their attention to the advantages of coke-breeze concrete for fireproof floors and roofs, it is desirable that precise information should be disseminated with regard to the dimensions of the rolled-iron joists used in this class of construction, in order to avoid both the superfluity of metal on the one hand, and the dangerous weakness on the other, which architects' engineering occasionally manifests. The table of iron floor joists is calculated for an equally-distributed load of 1 cwt. per square foot, which is more than a crowd of people could bring upon a floor even with the weight of a wooden floor added. Mr. Dunn supplies examples of the application of his diagrams. In the calculations for the strength of the stanchions, he used Gordon's formula. Even engineers who prefer to work out their own strain diagrams may find these useful for a check.

M. Berthelot on Carbonic Oxide.

The eminent French chemist, M. Berthelot, has been working of late with carbonic oxide gas, with a view to studying its less-known affinities and reactions. He has observed that carbonic oxide reduces ammonial nitrate of silver. The reagent is prepared by adding to a dilute solution of nitrate of silver some diluted ammonia, drop by drop, until the precipitate at first formed is entirely dissolved, but without proceeding further. If through this liquid are passed a few bubbles of carbonic oxide, it quickly turns brown, even when cold; if in ebullition,

it immediately gives a very abundant black precipitate. The reaction also takes place with an aqueous solution of carbonic oxide; it is extremely sensitive, and is effected even in presence of a large bulk of air. Thus it may serve as a test for the presence of carbonic oxide in a gaseous atmosphere, provided that the atmosphere in question does not contain any other reducing body. M. Berthelot remarks upon this test that the reaction supplies a new link between carbonic oxide and the aldehydes. Remarking also that carbonic oxide, which is stable at temperatures of from 3000° to 4000° C., gives indications of dissociation, with formation of carbonic acid and carbon, at about 600° to 700° C., M. Berthelot suggests that this apparent dissociation at the lower temperature is due to the decomposition of a polymer which forms at the expense of the carbonic oxide, and immediately decomposes.

A Large Chimney.

According to an abstract which appears in the recently-issued volume of the proceedings of the Institution of Civil Engineers, a chimney of important proportions has just been erected in Germany. It is intended to carry away the deleterious gases from a smelting works, and to deliver them at a sufficient height above ground-level to avoid all risk of nuisance. An elevation of 324 feet above the highest ground in the neighbourhood was considered to be necessary. The chimney is situated near the summit of a hill, and at a distance of about three-quarters of a mile from the works; and the base is nearly 200 feet above their level. The ground at the site consists of compact gneiss rock, and was simply dressed by hand and covered with a layer of concrete about 4 inches thick. On this a foundation pillar 40 feet square was erected, and a rectangular base-block 33 feet square by 30 feet high. The chimney proper was built on the base; commencing with a circular section a little smaller than the base, and carried up with an outside batter of 1 in 50, to a diameter of 10 feet on the top. The height of the circular portion is about 430 feet; giving a total height of 460 feet, or 660 feet above the works, from which a flue was carried along the surface of the ground. The thickness of the wall is nearly 5 feet at the base; gradually diminishing to 9½ inches at the top. The chimney is divided into twenty-six annular sections, each diminished in thickness by about 2 inches compared with the one below it. The first twelve sections are of equal height—about 10 feet; then follow three or four longer ones, ranging from 60 to 25 feet; and the remainder 13 feet each. The structure includes 5400 tons of building materials, and an iron cap weighing upwards of 15 tons. The inside diameter is 18 feet at the base, diminishing to 8¼ feet at the top. The data used in determining the thickness of the wall were a wind pressure of about 200 lbs. per square inch, a co-efficient of stability of 4·3, and the weight of the finished brickwork as 125 lbs. per square foot. This would give a pressure, under the maximum wind effect, of 240 lbs. per square foot on the stack and base, 126 lbs. on the foundation, and 72 lbs. on the solid rock below. With the load at rest, the maximum pressures would be respectively 160, 85, and 54 lbs. per square foot. In order to keep the maximum loading within the limit of 240 lbs., it was necessary to make the lower third of the stack thicker than was required on the consideration of stability alone. Iron rings of 2¾ inch by ½ inch section, put together in four segments, were built in at intervals; the rule being to place them at a distance apart equal to two-thirds of the diameter at the place where each one was fixed. This has the effect of gradually bringing them closer together from the bottom upwards. The cap is of cast iron of V section, enclosing, but quite independent of, the top of the stack. It is built in sixteen segments, having projecting lugs on the butt edges, which support cast-iron cappings covering the joints. The whole is thus free to expand or contract without reference to the brickwork. Climbing irons are provided both inside and outside; the former being in double series opposite each other, and the latter supplemented by safety staples about 22 inches apart. Two lightning conductors, of copper 0·4 inch diameter, are connected to the cap, and carried down the outside; one being also attached to each iron ring. They terminate in copper earth-plates 7 feet square—one buried in damp ground at a distance of 100 yards from the chimney, and the other in a cistern through which water is continually flowing. No external scaffolding was used; the interior climbing irons being utilized for supporting the lift pulleys during the building.

A New Regenerative Lamp.—At the German Exhibition besides a number of the well-known English lamps, there is on view an entirely new one of the regenerative type, known as the "Sylvia," the sole English consignees of which are Messrs. Mason, Son, and Co., of No. 9, South Street, Finsbury, whose stand is on the left-hand side from the principal entrance to the main corridor. The designs, of which there are six, are of a very ornamental character. The construction of the burner may be described as quite unique; and the appliance is likely to rival some of the many regenerative lamps now in the market. It is claimed for it that it gives a pure, soft, silver light with a considerable saving of gas; an illuminating power of 121 candles being, it is stated, obtained with a consumption of 9 cubic feet. There are four sizes of burner to each pattern; the largest consuming 25 cubic feet of gas per hour, and giving the light of 296 candles. Two of the designs provide for arms for the electric light; the regenerative gas-burner being in the centre.

COMMUNICATED ARTICLE.

GAS-ENGINES IN SMALL GAS-WORKS.

By Norton H. Humphrys, Assoc. M. Inst. C. E., F.C.S.

A few weeks ago some interesting correspondence appeared in the columns of the JOURNAL on the above subject. It consisted of replies elicited by an inquiry as to the advisability of putting in a gas-engine to run the exhauster in a gas-works making 7 millions per annum. With some little experience in gas-works making from 4 to 7 million cubic feet—comprising both the use of an exhauster driven by steam or by gas, and working without any exhauster at all—it appears to the writer that several points worthy of consideration have not been referred to in the replies above noticed. The consensus of opinion is decidedly in favour of the gas-engine, and very rightly so; for with modern gas-engines, at any rate, reliable working and freedom from costly repairs are readily obtainable, with reasonable management. It must be remembered that the system should have a fair trial, not only by proper arrangement in the first place, but by intelligent attendance and working.

As an abstract proposition, it may be laid down that an especially appropriate place for a gas-engine is at a gas-works. If with a supply of gas at cost price always available, a small steam-engine is tacitly admitted to be preferable to a gas-engine, it is difficult to persuade the consumers in the district as to the advantage of the latter. There is also some indirect benefit in having a gas-engine at the works. It acts as a valuable advertisement of this system of obtaining motive power; and the manager is also able to become expert in its working, and competent to advise customers who experience any difficulty. It is often said that a gas engineer should be able to advise his customers as to the uses of gas; and such advice is of a very restricted character if it includes only a recommendation as to what kind of apparatus to purchase. It should also comprise information as to the surmounting of little difficulties of an every-day nature that are sure to arise in the working of any new thing. A 1-horse power gas-engine would use little more than 20 cubic feet of gas per hour when in full work. Assuming it to run ten full hours a day, we have 200 cubic feet per diem, or some 70,000 cubic feet per annum. This, at the cost price of gas on the works, is only a matter of a few pounds. In figuring upon the consumption of gas, it must be remembered that the engine adjusts the consumption automatically in proportion to the work taken out of it.

The principal difficulties encountered are three in number; and they have led in some cases to the rejection of the gas-engine. In the working of an exhauster, it is not practicable to regulate the speed so accurately as can be done with a steam-engine, though I understand that this objection does not apply to some modern makes. There must perforce be, at times, a considerable amount of back passage through the throttle valve. It is therefore desirable that this, with its connections, should be full-way; that is, the same size as the other connections on the works. I can very well understand that, with 6-inch connections and a 2-inch or 3-inch bye-pass, some trouble from stoppage will arise. This will also be the case if the gas is not thoroughly condensed before it reaches the exhauster. Although the use of the gas-engine might aggravate the trouble arising from this cause, the whole of it must not be credited thereto, as, in any case, frequent cleaning of the exhauster would be necessary. Fully condensed gas, drawn violently through a narrow tube, would perhaps be injured by the precipitation of valuable illuminants, due to the friction; but in passing steadily back this would not occur.

The second point is the protection of the gas-engine from dust. This is a matter that can only be effected in gas-works by means of special precaution. An amount of dust that would not cause any inconvenience with a steam-engine, is sufficient to give rise to so much trouble with a gas-engine as to lead to its rejection. The slide-valves become scratched in a very few days, and are continually requiring re-facing. The delicate working parts in connection with the igniting apparatus soon suffer; and continual stoppage, with expense for repairs, is the result. The erection of a partition across the engine-room, so as to enclose the engine within a sort of inner chamber, is a great help. If any of the windows in the engine-room face towards the retort-house, the coke-yard, or the purifier-house, they must be kept closed. Other means of prevention will suggest themselves in each case. In small works, particularly, the exhauster-house must be adjacent to the retort-house. Frequently a door opening out of the latter opens directly into the former. If fixed in such circumstances, it can readily be understood that the gas-engine may not be a success.

It has often occurred to the writer that, since gas-engines are sometimes kept at work in localities where there are occasional clouds of dust, some sort of a protecting case might be furnished by the manufacturers, to enclose the slide-valve end of the cylinder, with its appurtenances. If this could be provided, the gas-engine would be suited for working retort-house machinery, coal-elevating apparatus, and doing other things to which it cannot be at present applied.

The third difficulty is one that is easily remedied. This can be done by connecting the gas supply to the outlet, and not the inlet of the gasholders. The latter is frequently the more

convenient; but is objectionable because it does not secure a regular quality of gas. In small gas-works, the retorts are not charged more frequently than once in two, or perhaps once in three hours. The result is that the gas as admitted to the holder will fluctuate in quality to the extent of two, three, or even more candles; being at the best immediately after charging and gradually falling in quality until the next charge. The rich gas at the higher limit causes deposits of carbon in the cylinder and ports; and the poor gas at the lower limit means slow firing of the charges, misses, and perhaps actual stoppage. A gas-engine running at close on to its maximum power is as good a photometer in a practical way as the most elaborate arrangement brought out by the London Gas Referees. If the gas is below par, it shows signs of distress; if too good, there is the deposit of carbon. In these days of gas-engines and regenerative burners it is more than ever necessary that the quality of the gas should be uniform.

The troubles above mentioned are aggravated by occasional neglect of the oiling or cleaning. A gas-engine must be kept in thoroughly good trim if it is to work well and to wear well. So long as gas-engines remained comparatively rare things, it frequently happened that those in country places suffered through the ignorance of local machinists who undertook to keep them in order. The increasing demand for this form of motor has so far remedied any difficulty in this way, in that a few gas-engines are used in even our smallest towns, and their construction and working are now generally understood.

One cause which has hindered the adoption of gas-engines, is that gas companies themselves have not been very careful in the matter of using them for their own purposes. Even at the present day, when several different sources of power, besides that needed for the exhauster and pumps, are required, there are some large works that do not boast even a single gas-engine. A little attention to this fact would soon stimulate the demand for these motors, without which no important improvement can be expected. There is room for advancement, not so much in the matter of economy of gas, as in simplicity of construction and reduction of the first cost. The gas-engine business is the steadiest line of all the various departments included in the purposes for which gas is used. It does not secure special summer consumption; but it does that which is next in order—viz., a good all-the-year-round day consumption. It should therefore be carefully cultivated; and it will pay for a reasonable degree of enterprise.

When dealing with gas-works having an annual output of less than about 7 million cubic feet per annum, there is a special point where the advantage of the gas-engine as compared with the steam-engine comes in. In such an establishment, the whole of the work can be done, during some months in the summer, by one man. If there are a steam-engine and boiler on the premises, they are usually allowed to stand idle at this period, partly because the engine is not wanted except for a few hours each day, and partly because the man, amid his other numerous duties, has not time to attend to keeping up steam, working the boiler furnace, &c. Here the gas-engine comes in as a convenient servant. A few minutes' attention each day will keep it in order; and it does not use any fuel, except while it is actually at work. So the man can run the exhauster for three or four hours after each charge, or for any period that may be found most advantageous. An intelligent man will thus secure quite 500 cubic feet per ton of coal beyond that which would be yielded without the exhauster. At the same time the engine is capable of driving tar, liquor, or water pumps, coke-breaking machinery, assisting the purification by keeping the scrubber supplied, and doing other work. With the aid of overhead tanks for storing water, liquor, and tar, the engine will be a great help—obviating the necessity for occasional additional assistance, and enabling the one man to meet, single-handed, a larger demand than he would otherwise be able to supply.

Gas Coal in New South Wales.—We learn from a copy of the *Sydney Mail* lately to hand that some important seams of coal have been found in the rich alluvial flats of the Hunter River district. The East Greta Company, which has been formed with a capital of £50,000, have been the first to develop these valuable stores of mineral wealth. East Greta is about three miles from West Maitland, and about twenty-three miles from Newcastle. The value of the coal in this seam may be estimated from the following analysis: Hydroscopic moisture, 2·05 per cent.; volatile hydrocarbons, 40·87 per cent.; ash, 6·05 per cent.; fixed carbon, 51·03 per cent.; coke, 57·08 per cent.; specific gravity, 1·288; sulphur, 0·782. The upper seam of this mine yields, according to a test made by Mr. T. J. Bush, Engineer of the Australian Gaslight Company, 12,000 cubic feet of gas per ton, of 18·22-candle illuminating power, with 11·5 cwt. of coke; the lower gives 12,800 cubic feet of gas of 17·58-candle power per ton, with 13 cwt. of coke. The coal of the district is in large demand. At Newcastle, the coal is greatly wanted for enriching gas; and it realizes now 1s. per ton more in Newcastle than the Newcastle coal. The reason for the superiority of the Maitland seams over the very excellent coal of Newcastle and the immediate district may be found in the belief of geologists that these seams are older than those about the great coal city.

TECHNICAL RECORD.

THE NEW CANNEL SEAM IN NORTH WALES.

In the JOURNAL last week we briefly referred to the important discovery of cannel recently made in the mines of Messrs. S. Chandler and Sons, at Pontybodkin, near Mold. It was then intimated that the quality of the cannel was extremely good; but we have since been furnished with the report of Mr. John Methven, Assoc. M. Inst. C. E., of Nine Elms, on the analysis of the samples of curley and smooth supplied to him for the purpose by Messrs. Chandler. This subject, and the report bearing upon it, possess at the present time a peculiar interest to those engaged in the production of gas of high quality. Gas enriched by the destructive distillation of high-class cannel coal is, to all intents and purposes, a known quantity to the profession. Therefore, before giving the results of the tests embodied in the report, it may not be out of place to give a brief account of the discovery of this valuable seam, which is exactly identical in thickness and stratification with the bed of cannel worked years ago in the old Leeswood Green Collieries.

Pontybodkin is situated almost in the heart of the Leeswood and Coed-Talon district, where operations for coal discovery in virgin ground have been for some time past in active progress. A necessity arose for driving an adit level into an outcrop, which resulted in certain indications that clearly pointed to the existence of a vast area of cannel about 4 ft. 6 in. thick. It will be readily understood that immediate steps were taken by the owners to follow and verify these indications, with the result that several hundred tons of the rich mineral were brought to the banks; while boring operations were at once started to prove the area, which appears to be, at least, upwards of 200 acres in extent—the remaining 200 acres of the property not having yet been proved. The seam consists of three layers, exactly as did the old Leeswood Green seam—*i.e.*, on the top is 2 ft. 3 in. of smooth cannel; in the middle, 1 ft. 4 in. of curley cannel; and at the bottom, 12 inches of shale. Taking the seam as 4 feet in thickness, and estimating about 6000 tons to the acre, this would give a total of 1,200,000 tons of cannel alone; but if the mineral underlies the whole of the 400 acres, it will be a very fortunate and valuable discovery for the owner.

The following are extracts from the reports made by Mr. Methven on the samples of curley and smooth cannel submitted to him:—

I.—LEESWOOD VALLEY CURLEY CANNEL.

Chemical Analysis.

Volatile matter, containing 0·82 per cent. of sulphur. .		63·92 per cent.
Coke, consisting of—		
Carbon	27·62 p.c.	
Sulphur.	1·48 ,,	
Ash	5·66 ,,	
	34·76	,,
Water, expelled at 212° Fahr.	1·32	,,
	100·00	

Practical Results.

Volume of gas made per ton (2240 lbs.), corrected to 60° Fahr. and 30 inches of the barometer, 15,306 cubic feet, of an illuminating power, as tested by a Sugg table-top cannel-gas burner at the rate of 3·3 cubic feet per hour in an open photometer of the "Lambeth" pattern, equal to 30·62 standard candles; hydrocarbons condensed by bromine, 16·79 per cent.; coke made per ton of cannel (dry), 770 lbs.; value of gas per ton of cannel, in pounds of sperm, 1606·8 lbs.; ash in coke, 16·3 per cent.; specific gravity of the cannel (water = 1), 1·135; weight of a cubic foot of cannel, 70·94 lbs.; yield of tar per ton of cannel, 26·2 gallons; yield of ammoniacal liquor per ton (Wills's test), 8·3 gallons, 10-oz. strength.

Remarks.

The above results indisputably place this cannel at the head of the list of the most valuable cannels raised in the kingdom. It possesses a high percentage of volatile matter, and a coke of very superior quality, and one eminently suitable for mixing.

II.—LEESWOOD VALLEY SMOOTH CANNEL.

Chemical Analysis.

Volatile matter, containing 0·94 per cent. of sulphur . .		46·20 per cent
Coke, consisting of—		
Carbon	45·74 p.c.	
Sulphur	1·30 ,,	
Ash	5·46 ,,	
	52·50	,,
Water, expelled at 212° Fahr.	1·30	,,
	100·00	

Practical Results.

Volume of gas made per ton of cannel (corrected), 12,321 cubic feet, of an illuminating power, as tested by the Gas Referees' cannel burner in a "Lambeth" photometer, equal to 21·82 candles; yield of coke per ton of cannel, 1177 lbs.; ash in coke, 10·4 per cent.; condensation by bromine, 9·5 per cent.; equivalent in sperm value per ton, 921·7 lbs.; specific gravity of cannel, 1·27; weight of a cubic foot of cannel, 79·38 lbs.; yield of tar per ton of cannel, 12·3 gallons; yield of ammoniacal liquor per ton of cannel, 13·8 gallons, 10-oz. strength.

Remarks.

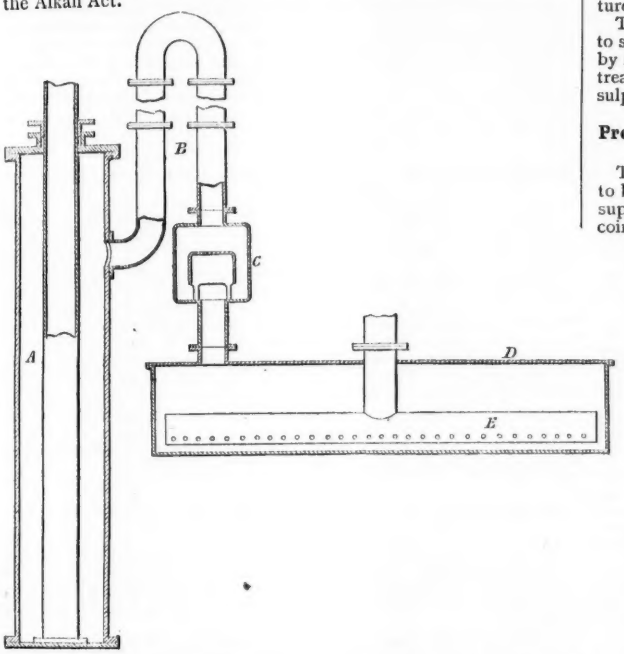
This cannel may fairly be described as a very good cannel, possessing a very high yield of a moderate quality of gas. The coke produced is abundant in quantity and of superior quality, and very suitable for mixing. It contains a low percentage of ash.

Like poets and painters, there are cannels *and* cannels. That which is now under notice is, as already mentioned, identical in every feature with the Leeswood cannel bed which was worked

in the Coed-Talon district, we believe, 35 years ago; and a great deal of it was consumed at the Fulham works of The Gaslight and Coke Company under Mr. T. N. Kirkham, who was then Engineer of that station. This was done at the time in consequence of the competition for gas of high quality introduced by the Western Gaslight Company of that day. The non-professional are apt to broadly take it for granted that anything bearing the name of cannel is necessarily good for gas making. Our readers, of course know better. Some so-called cannels are mere black basses, which would be dear for gas-making purposes if supplied at the cost of delivery; while, on the other hand, we have the famous "Toburite," or Boghead, and next to this the curley cannel of the class just discovered at Pontybodkin by Messrs. Chandler, which it is to be hoped may be proved over the whole area of 400 acres, for the sake of the gas industry, the mining neighbourhood, and the owners, who are to be congratulated on this virgin coal-field, which, of course, contains all the accompanying seams of bituminous and anthracite coal peculiar to this coal section.

ELLERY'S ACID CATCH-BOX FOR SULPHATE PLANT.

The accompanying illustration shows the ingenious form of acid catch-box for sulphate of ammonia plant, which has been devised by Mr. C. Stafford Ellery, the Engineer and Manager of the Bath Gas-Works, and was referred to in the JOURNAL last week in the notice of the reports of the Sub-Inspectors under the Alkali Act.



The action of the appliance may be explained in few words. The fumes from the saturator pass through a perforated lead pipe E in a tank of weak acid D, and thence into a baffling chamber C, up a vertical tube B, to the condenser A. The acid flows back into the saturator or mother-liquor tank as required. The Inspector of gas-liquor works in the south-west of England district (Dr. A. C. Fryer) states that this is the most perfect form of acid catch-box he has seen in operation.

The Scrubbing of Gases.—At the meeting of the Glasgow and Scottish Section of the Society of Chemical Industry on the 1st ult., Professor Mills made a verbal communication on the scrubbing of gases. He said that, in order to determine the amount of matter that can be removed from a gas—*e.g.*, coal gas—by scrubbing, the dry gas is passed through a succession of U-tubes of exactly the same pattern, and each about half filled with the same weight of pumice of uniform grain, saturated with heavy lubricating oil. It is convenient to cool the gas and U-tubes with ice. After a suitable time has elapsed, tube I. (that nearest the supply) will be found to have absorbed a certain weight a of hydrocarbon; tube II. will contain less—say, $r\,a$; tube III. will contain less—say, $r\,(r\,a) = r^2\,a$; &c. Three tubes will usually be found sufficient. The total amount of hydrocarbon that would have been absorbed, from the volume of gas under experiment, by an infinite number of such tubes, is $a \div (1 - r)$. It is obvious that tube I. should not be allowed to become saturated; and that the gas to be scrubbed should not be saturated with the various matters to be removed.

REGISTER OF PATENTS.

Purifying Coal Tar and Rendering it Suitable for Paint.—Davis, T. H., of Manor Park, Essex, and Davis, A. H., of Rock Ferry, Cheshire. No. 10,976; July 15, 1890. [4d.]

The patentees propose to treat coal tar in the condition either as obtained from gas-works or after being refined by vigorous agitation in a vessel with an aqueous solution of sulphate of copper or sulphate of zinc. The agitation must be kept up for two hours, and so performed as to ensure every particle of the tar being washed by the solution. By this means the ammonia and the sulphuretted hydrogen, whether free or combined, is abstracted from the tar; the former producing with the sulphuric acid of the salt used a sulphate of ammonia, and the latter an insoluble sulphide of copper or zinc. The whole is now transferred to a wooden tank of sufficient dimensions to hold the entire charge, and to leave room for a further agitation. It is at once thoroughly washed (preferably by mechanical means) with warm water for about an hour; and is then allowed to stand for 24 hours. At the end of this time, the tar is drawn off from the bottom of the tank, and subjected to a further similar washing process, which must be repeatedly performed until the washing waters are perfectly neutral to litmus paper or other test. When this is the case, the tar is of the neutral character the process is designed to accomplish. It is now left at rest for 24 hours, and the tar is then run off from the bottom, and transferred to store tanks for final settling. It is now left at rest in these tanks for at least a week, and then drawn off again from the bottom in the condition ready for sale.

When this purified tar is required as an antifouling as well as a preservative coating for the bottom of ships or other submerged structures, carbolic or cresylic acid (either crude or refined) is thoroughly incorporated with it in proportions varying with the nature of the waters in which the ship sails, or in which the submerged structures may be placed.

The washing waters from the second process are collected and allowed to settle; and the precipitated sulphide of copper or zinc is collected by filtration through fine canvas, or, after washing on the filter, is treated with sulphuric acid in a suitable vessel. By this means the sulphate of copper or zinc is re-obtained for further use.

Prepayment Gas-Meters.—Hawkyard, J., of Saddleworth, and Braddock, J., of Oldham. No. 12,584; Aug. 12, 1890. [8d.]

This invention relates to the construction of automatic apparatus to be applied to an ordinary wet or dry gas-meter for the purpose of supplying a definite amount of gas on prepayment by a corresponding coin or coins.

Fig. 1.

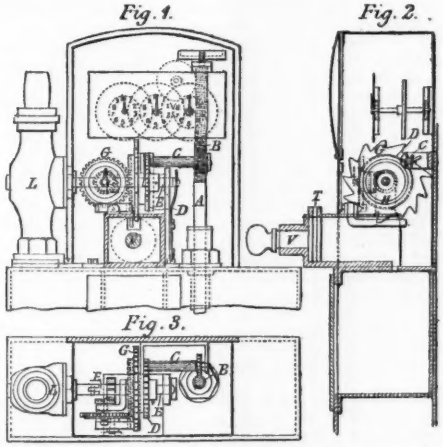


Fig. 2.

Fig. 3.

In a wet gas-meter, there is fixed upon the ordinary vertical worm-shaft A, which puts into action the indicating apparatus, an additional worm B, actuating a long pinion C. This pinion is also in gear with a spur-wheel D (the "first-motion" wheel) keyed or fixed upon a short shaft or spindle E, so mounted in the framing of the apparatus that it can revolve, and can also slide or move endwise therein; whilst the teeth of the wheel will always remain in gear, whether the shaft is moved to the right or left. Hence the wheel and its shaft will always revolve with the drum of the meter, but at a greatly reduced speed. Mounted upon the shaft, but so as to revolve independently upon it, is a ratchet-wheel G, having (say) thirteen teeth; and upon the face of this wheel, next to the "first-motion" wheel, is a circular projecting rim or cam, against which a tooth or projection fixed to the side of the "first-motion" wheel works; a spring acting against one end of the shaft keeping the tooth or projection always pressing against the circular cam. This latter has at one part a notch or depression, one side of which is perpendicular and the other side an inclined plane; so that, supposing the ratchet-wheel to be stationary, as soon as the "first-motion" wheel has revolved to such an extent as to bring the tooth or projection opposite the depression on the cam, the spring will force the tooth down the inclined plane into the notch. But when it comes to the perpendicular part of the notch, it will lock the drum of the meter fast. The opposite end of the shaft to that upon which the spring acts is attached to the rod of a stop-valve in the supply-pipe at L; and thus, as the spring moves the "first-motion" shaft endwise (when the tooth comes opposite to the depression on the cam), it at the same time shuts the valve.

On the shaft E there is also keyed a spur-pinion, driving (by means of a crown-wheel) a transverse arbor, the other end of which carries an index or pointer. On the boss of this crown-wheel revolves loosely a spur-wheel Q, the face of which carries a dial plate; and this spur-wheel is driven by a crown-wheel fixed to the back of the ratchet-

wheel G. Thus it will be evident that the "first-motion" wheel D drives the index or pointer, and the ratchet-wheel G the dial plate.

The frame of the apparatus forms a kind of box in the top plate of which is a slot. The lower part of the ratchet-wheel G projects through this slot; and in the front part of the top of the box at T is a transverse slot of just such a length and width as to allow a penny to pass through. This part projects through the front of the meter casing. In the front of the box is a projecting pap or boss, through which slides horizontally a ram or pusher V, having at the outer end a knob. The inner end of the ram is formed with a square head sliding in the box; and the upper side of this head is provided with a slot or recess of such a size that, when the ram is drawn out to its fullest extent, the two slots coincide, and a penny can then be dropped through the fixed slot T in the top of the box into the recess in the head of the ram. The coin cannot, however, be introduced at any other time.

A notch is cut in the upper part of the ram-head opposite to the ratchet-wheel G (see fig. 1), so that the head when empty, will just escape touching the teeth of the wheel. But when the recess contains a penny, it closes this notch; and each time that the ram is pushed in (with a penny in it), it will cause the ratchet-wheel to turn one tooth. A lever catch is also provided, one end of which takes into the teeth of the dial-wheel Q, while the other end is carried into the ram-box in such a position that, every time a penny is pushed forward, the catch releases the dial-wheel, but at other times the catch is pressed into the teeth by a spring.

The normal position of the apparatus is as follows (see fig. 1): The index points to zero; the tooth or projection on the side of the "first-motion" wheel D is at the bottom of the notch in the cam; and the spring at the end of the shaft holds the stop-valve L closed. The teeth of the "first-motion" wheel are locked by those of the pinion C, which is also engaged with the worm B on the vertical shaft A; and hence the meter is immoveable, and no gas can pass through. When gas is required, the ram V must be pulled out to its fullest extent, which will bring the recess in the head of it just beneath the slot T in the box; and a penny can then be dropped through the latter into the former. The ram is now pushed in, and the penny coming against a tooth of the ratchet-wheel G, will cause it to turn a one-thirteenth part of a revolution—at the same time indicating on the dial that a penny-worth of gas has been paid for. The movement of the ratchet-wheel will cause the inclined part of the recess in the cam to act against the tooth on the side of the "first-motion" wheel D, forcing the latter and the shaft outwards into the position shown by the dotted lines; thus opening the valve L, and admitting gas to the meter. As the ram is forced in further, it moves the flat part of the cam under the tooth; the penny then releases the catch; and when the ram is forced fully home, the coin drops out through a slot in the bottom into a money-box beneath. The gas being now turned on, the meter begins to work; and the "first-motion" wheel D slowly revolves, carrying back the tooth or projection towards the incline of the cam, and moving the pointer gradually back towards "zero" as the gas is consumed.

As the tooth commences to slide down the incline, it allows the spring to gradually close the stop-valve L; and thus it gives warning that the pennyworth of gas is becoming exhausted. Then if another penny is not put in the slot, the stop-valve will shut off the gas completely by the time that the pennyworth has been consumed.

If at any time the valve L should become temporarily leaky, the tooth or projection coming against the perpendicular end of the slot will stop the revolution of the drum, and no gas can pass to the burner. And if two or more pennies are passed into the slot one after the other, the tooth travels further along the flat part of the cam, and hence it takes a correspondingly longer time before the gas commences to be shut off, while at the same time the pointer indicates the corresponding number. Not more than twelve pennyworths of gas can be paid for at one time, as opposite to the thirteenth tooth there is a locking notch, into which the tooth falls. Therefore no more money can be paid in until the "first-motion" wheel D has been carried back some distance by the motion of the drum of the meter, as the gas is consumed.

When the gas is shut off at the tap, the motion of the meter drum is stopped, and the whole apparatus remains immoveable, although a certain amount of unconsumed gas may have been paid for. This, however, will be indicated by the pointer on the dial; and on opening the tap and lighting the gas at any future time, this amount will be duly supplied without further payment before the stop-valve L is automatically closed.

In applying this apparatus to a dry meter, the "first-motion" wheel D is merely driven from a worm on the horizontal worm-shaft, which works the indicating apparatus.

It will be understood that, in either case, the gearing will be so proportioned that so many cubic feet of gas as are equivalent in value to 1d. will be delivered for each tooth of the ratchet-wheel G taken up. Any change in the value of gas can therefore be provided for by changing the "first-motion" wheel D for one having a correspondingly different number of teeth. The meter, of course, then indicates to the consumer whether or not he has been supplied with the equivalent number of cubic feet of gas according to the current price per 1000 feet.

Manufacturing Sulphate of Ammonia.—Dempster, R. and J., of Manchester. No. 12,661; Aug. 13, 1890. [4d.]

These improvements relate to apparatus for the removal of sulphate of ammonia from the saturators to the drainers. To effect this, the patentees propose to employ a pump of any ordinary description, or a centrifugal or other rotary pump. In the former case, it would be fixed within the saturator. The suction tube is arranged to extend to nearly the bottom of the saturator; and from the tube a branch tube is connected leading to the drainers. The ends of these tubes are provided (in case of an ordinary pump being used) with suitable valves arranged in such a manner as to alternately close and open with each stroke of the pump piston; but in case centrifugal or rotary pumps are employed, such clacks may be dispensed with. The pump barrel and piston may be constructed at a higher level than these tubes, and of larger area; but a form of pump may be used wherein the piston is below the branch tube, in which case the branch tube will not require a valve or clack; and in case a centrifugal or rotary pump is employed, neither of the tubes will require to be provided with clacks. As a precaution against the possibility of drawing the liquid over to the pump barrel, where the ordinary kind of pump is employed, the pump barrel is (by preference) fixed at a sufficient height over the junction to the branch tube; or a syphon pipe of sufficient height may be introduced; or a weighted valve may be employed to accomplish the like object. The pump and tubes are (by preference) made of lead or copper as a material for the tubes, and india-rubber, vulcanite, lead, or other material little influenced by acid or ammonia for the clacks or valves.

Gas Motor Engines.—M'Ghee, G., and Burt, P., of Glasgow. No. 12,690; Aug. 13, 1890. [8d.]

This invention, relating to gas motor engines, comprises antipulsators (or means for preventing the inhalations of the engine from affecting the pressure of gas in neighbouring pipes); also governors and starting gear.

The antipulsator comprises the ordinary reservoir bag or other equivalent receptacle, the gas to and from which alternately flows by the same pipe or channel. The gas-inlet pipe is connected to the engine; and normally it is open to and leads into the flow-pipe to the bag. But when the engine is about to inhale the gas, the inlet-pipe is shut off by a valve or other equivalent device operated by the engine, and the motor charge is inhaled from the bag through the flow-pipe.

The governor comprises an oscillating lever, actuated by a cam on the engine-shaft, or equivalent thereto. On the other end of the lever is a pin and disc or wheel, which is moved transversely against a spring by coming against a coned stud. According to the speed of the engine, the spring returns the stud-disc to opposite (or not) the valve spindle, so as to open (or not) the gas-supply valve.

The starting gear comprises an ordinary air-tight chamber or tank for containing the compressed fluid, communicating with the cylinder by a pipe or passage having a check-valve, constructed with a passage communicating between both sides thereof, with a stopcock on it, by which the fluid chamber and cylinder can be put in communication together. To start the engine—the tank being charged—the crank is merely set over the centre, and the valve or cock of the pipe from the tank opened, so as to allow the fluid pressure in the tank to act on the pistons and drive them forward.

Gas Cooking-Stoves.—Leoni, S., of Camden Town, N.W.. No. 12,712; Aug. 13, 1890. [8d.]

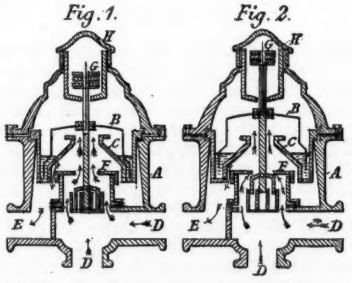
This invention, relating to gas cooking-stoves, comprises a hollow casing provided with covers, and having partitions and passages, whereby the gas is conducted direct from each gas-tap to the burners arranged in series; the casing being fixed underneath the hot plate, so as to dispense with the usual system of gas-pipes bent and set to suit the position of each burner. The bending and setting of such pipes (says the patentee) involves much skilled labour; and the pipes and fittings being frequently in the way of the gas-flames are exposed to the injurious effects resulting from the overboiling of the cooking utensils. The invention also comprises a loose portable heat deflector, consisting of a frame having a number of plates which fit between the burner-bars, so that they are located just above the gas-jets. A hollow bar forms a support for the oven door, and holds together the two side frames of the oven; thus forming a chamber from which the gas flows to the burners inside the oven.

Gas-Governors.—Winterflood, J., of Barnsbury, London. No. 19,250; Nov. 26, 1890. [6d.]

This invention relates to bell-float apparatus employed to regulate excessive pressure of gas down to a fixed maximum, by means of a single-beat valve dipping into a mercury dish, and regulated by a stem depending from a moveable float operating in or against the gas-inlet orifice.

Heretofore (says the patentee) the bell-float has been constructed like an inverted cup or basin dipping into a mercury dish, and the valve-stem has been exposed to the pressure of the unregulated gas, which, being variable, causes the float and the pressure of the gas at the outlet of the regulator to fluctuate, which defect it is the object of this invention to overcome. The unregulated gas is prevented from acting upon the base of the stem or valve by a cup sealing. The bell-float is made like an inverted cup with an extending flange and rim, as shown in the illustrations; fig. 1 being a side elevation of the whole arrangement, with the bell-float at rest, and fig. 2 with the float and valve in action.

Fig. 1. *Fig. 2.*

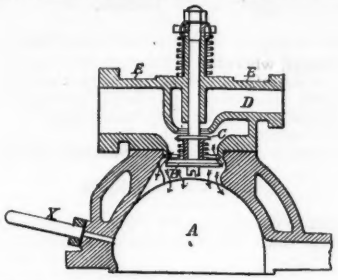


A, is the body proper; B, the gasholder or bell-float; C, the mercury dish into which the bell-float dips; D, the inlet ports; E, the outlet port; F, the cap or valve; G, the regulating-weights; and H, the cap for protecting the regulating-weights.

Gas Motors.—Capitaine, E., of Eilenburg, Germany. No. 8069; May 11, 1891. [6d.]

This invention consists in the application to gas motors of an

automatic inlet-valve for the gaseous mixture, constructed to advantageously distribute the mixture in the combustion chamber.



This chamber, with the inlet-valve for the gaseous mixture, is shown in cross section in the engraving.

A is the combustion chamber where the motor works with one explosion to every two revolutions; X being the igniting tube. C are valves mounted on a spindle, so as to be capable of sliding thereon. Whilst the valve B shuts off the combustion chamber A from the outside, the valve C serves for shutting off the gas-supply passage D. The valve C is pressed by a spiral spring against a stop pin, and the distance between the two valve parts is such that, as soon as B closes against its seating, C shuts the gas-supply passage. On the screwed upper end of the valve-spindle, there are two nuts, between which is fixed a spring pressing by both its sides against the cylindrical part of the valve casing E, and sliding thereon when the valve-spindle is moved. By the frictional resistance thus brought about, the noisy vibration of the valves is prevented. The entering gaseous mixture is thus caused to unite itself into a compact stream, in order that it may pass into the combustion chamber at a very low velocity; the intention being to prevent a whirling movement of the gases in the combustion chamber and cylinder by means of the entering mixture.

APPLICATIONS FOR LETTERS PATENT.

11,508.—Crook, T., "Improvements in gas-engines." July 7.

11,511.—Potter, W. G., "A regenerative gas-lamp and ventilator for lighting and ventilating railway carriages, and general lighter." July 7.

11,512.—Potter, W. G., "A gas-regulator for regulating the control of gas to street lamps and mains." July 7.

11,541.—Valentine, J. S., "An improved safety attachment for gas-burners." July 7.

11,570.—Foxall, J., "Improvements in valves for gas-meters." July 7.

11,628.—The Maatschappij Eureka, "A new or improved pressure regulator for gas-engines." July 8.

11,645.—Evered, R. B., and Rudling, T., "Improvements relating to combination gas and electric fittings, and gas-fittings." July 8.

11,680.—Kaselowsky, E., "Improvements in gas and petroleum engines." July 9.

11,734.—Potter, W. G., "A patent gas-burner and spreader for regenerating burners." July 9.

11,740.—Dinsmore, J. H. R., "Improvements in the manufacture of gas for illuminating and heating purposes, and in or connected with apparatus therefor." July 9.

11,784.—Hilton, J. H., "Improvements in apparatus for carburetting gases." July 11.

Sales of Shares.—A few days ago, ten shares in the *Cirencester Gas Company* sold for £31 10s. each; and ten others at £31 12s. 6d.——A parcel of original £10 "A" shares in the *Sevenoaks Gas Company* has just been sold at the rate of £25 per share; another lot of the same shares changing hands at an average of £24 10s. per share.——At Halesworth yesterday week, Messrs. Lenny and Co. sold by public auction 25 £5 shares and £257 of original and new subscription stock in the *Halesworth Gaslight Company*. The shares realized from £7 to £7 6s. each; and the stock produced about £363.

New Water-Works for Audley (Staffs.)—A complete system for the supply of water to the district under the supervision of the Audley Local Board of Health has lately been formally opened. The works consist of a well and bore-hole sunk into the pebble beds of the new red sandstone, at a place called Mill Dale. The well is lined throughout its length with cast-iron tubing of great strength, in which is fixed a set of powerful three-throw pumps driven by a pair of compound horizontal engines of 110-horse power. The condenser is one of Masterman's patent diaphragm type. The machinery is covered by handsome buildings designed by Messrs. Ford and Slater, Architects, of Burslem, who were the Consulting Engineers for the scheme. The water is raised from the well and driven through the condenser, and then through an 8-inch main to the reservoirs. about three miles distant, situated at an elevation of 530 feet from the bottom of the well. Mains varying in diameter from 7 to 2 inches are taken off at convenient points along the route; and air-valves, back pressure valves, sluice-valves, and hydrants are provided in ample numbers in suitable places. There are two reservoirs, one of concrete the other of wrought iron, affording a storeage capacity of 218,000 gallons. The whole of the machinery was designed and constructed at the Union Foundry, Kidsgrove, under the personal supervision of Mr. C. E. Masterman, Assoc. M. Inst. C. E., Manager of that branch of the business of Messrs. Woodhouse and Rawson United, Limited, who are better known to most of our readers as electrical engineers. The machinery was started by Mrs. Frank Rigby, wife of the Chairman of the Local Board. Up to the present time there has been no adequate water supply for the rapidly-growing district of Audley, which now contains a population of about 16,000; and the engineering difficulties of the scheme now completed, owing to the nature of the ground (which is undermined with collieries), were considerable. These, however, have all been successfully overcome.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by correspondents.*]

The Enrichment of Coal Gas by Liquid Hydrocarbons.

Sir,—I venture to think the reply of Mr. Clark to my query, so far as it is an answer at all, is a confirmation of past experience; and I might well be content with the impression it will doubtless convey to most of your readers. I think, however, as he still continues to throw doubt on what I believe to be the inevitable result of the enrichment of coal gas by the aid of liquid hydrocarbons, it is only fair for me, as a practical engineer, to ask him to explain the report which appears in the same number of the Journal as his answer (p. 78), where the South Metropolitan Company were summoned on June 19 and 20—two days in succession—for sending out gas of less illuminating power than it ought to be under the Company's Special Act. In cross-examination, it was proved by Mr. Colbrook, the Company's tester for 13 years, that, while using a duplicate of the instrument employed by the Official Gas Examiner, the result was an illuminating power of 17·8 candles when it left the works, whereas the evidence of Mr. Hoare Collins, the Official Gas Examiner, showed that when testing the gas at Lewisham Road testing-station, a mile from the works, the illuminating power was found to be 15·29 candles. Comment is unnecessary.

Ramsgate, July 17, 1891. William A. Valon.

Sir,—Replying to the letter of Professor Lewes, the cost of the enrichment of gas by cannel is calculable, and need not depend upon the *ipse dixit* of anyone. I arrived at the cost of enrichment by cannel with the aid of the following factors:—

Character of Enricher—Curley Cannel.

Details of cost—	s.	d.
Curley cannel, per ton, f.o.r.	46	0
Labour (unloading, stocking, and breaking)	7	1
Fuel and cost of steam	0	6
	53	7
Less products	5	9
	47	10

Taking the volumetric value of a ton of the curley cannel to equal 13,000 cubic feet, the photometric value to equal 30 candles, and the actual efficiency of the generating system to equal 80 per cent., we have the cost of adding 1½ candles of luminous or photometric value to 1000 cubic feet of 16-candle gas to equal 2·78d. This is a great difference from 4d., the cost adopted by Professor Lewes. If the data I have adopted and now exposed are wrong in any particular, I should be glad to be put right. I think, however, that the figures are sufficiently near for comparative purposes.

In calculating the efficiency of my enriched water-gas plant, using the distillate, I allowed for the difference in the values of the oils; but I merely gave the figures as an interesting illustration. I should say that the corrected figures given for the Tatham process will be difficult to realize in actual commercial practice. I should like to see details of the calculations by which the corrected figure was obtained.

I cordially appreciate Professor Lewes's vigorous work, which should remove many obscurities in the science and practice of luminous gas making.

Liverpool, July 16, 1891. B. H. Thwaite.

The West Stoking Machinery at East Greenwich and Beckton.

Sir,—I notice among the paragraphs in the Journal for the 14th inst. an account which I should deem to be unauthorized by the Gas Committee of Leeds, as the statements therein are misleading, and calculated to convey an erroneous impression in the minds of those who read them. It states that—

> The Sub-Committee which was deputed a few weeks ago to visit several large gas-works at which machinery has been adopted, first went to East Greenwich and Beckton. Both at East Greenwich and Beckton the apparatus had been stopped for repairs when the deputation arrived. Efforts were made at each place to work it; but a breakdown is said to have been the result in both instances. They found the machinery reduces the number of hands required by one-third; but they seem to think that the apparatus they saw did not work so well as might be wished—the necessary repairs being frequent and costly. The deputation appears to have returned home believing, almost unanimously, that, unless some better method of machine-stoking than that in operation at East Greenwich can be found. Leeds had better stick to manual stoking.

It is well known that the machinery at the East Greenwich works was erected by the West Company. This stoking, coal-breaking, and elevating machinery is all driven by gas-engines; and I am glad to say is now being thoroughly tested and compared against hand-labour.

I wish your readers to know that I have a letter from the Superintendent of these works which gives an account of what really took place when the deputation visited the works, wherein he says that "someone of the Leeds Gas Committee is misrepresenting the working of the machinery here," and states that, "What took place when they were here was a stoppage of ten minutes' duration, owing to the gas-jet going out on the main gas-engine; and this was explained to them. The machinery was working perfectly beyond this little hitch, which was caused by deficiency in the gas supply."

They then visited Beckton, where some of my machinery had been working for very many months in No. 12 retort-house. But at the time of their visit it was let down for repairs and the renewal of retorts. It was No. 8 retort-house that these gentlemen visited, to inspect Mr. Trewby's system of inclined retorts; and it was the machinery in connection with these that was temporarily thrown out of operation. It will, however, be seen that the statements made are unfounded as far as my machinery is concerned.

It appears to me that there are prejudiced minds, who, for political or other reasons, pervert the truth. I suppose the individual who supplied the original information to the *Yorkshire Post* desired to

influence the Gas Committee in framing their report, as I find he also states that the machinery only reduces the hands required one-third. I wish to inform him that at the present time the machinery is reducing the men *one-half* at the East Greenwich works which the Committee visited.

After these remarks, I will leave your readers to form their own opinion as to the statements in the paragraph referred to; simply stating that all machinery asks for is fair play. Then, in my opinion, it will speak for itself. I am writing a paper on this subject which will be read before the North British Association of Gas Managers; and I shall be glad to forward a copy of it, through the *Yorkshire Post*, to the gentleman who needs enlightenment on the above.

Manchester, July 18, 1891 JOHN WEST.

Extensions at the Lymm Gas-Works.—The productive and storeage capacity of the Lymm Local Board Gas-Works have just been increased by the introduction of generator furnaces, which have been put in by Messrs. Drake and Son, of Halifax, and the telescoping of a gasholder, which has been carried out by Messrs. W. C. Holmes and Co., of Huddersfield. These improvements have been effected under the superintendence of the Manager (Mr. W. Severs).

The Increase in the Price of Gas at Liverpool.—At their meeting yesterday week, the members of the Lighting Sub-Committee of the Watch Committee of the Liverpool Corporation considered the advisability of entering a protest against the increase in the price of gas from 2s. 8d. to 3s. per 1000 cubic feet. Eventually the Town Clerk was instructed to write to the Gas Company, and ask for an explanation of the reasons which have led to this increase. It means about £3000 additional expenditure by the Corporation yearly. In the course of the proceedings, it was stated that the Company had statutory power to charge 4s. 6d. per 1000 cubic feet if they deemed it necessary.

The Rhondda Water Supply.—Dr. James, the Medical Officer of Ystrad, has reported to the Local Board that a few days ago he visited the water-works at the extremity of Blaenrhondda, and found indications that turbid water from the colliery levels in the immediate vicinity had very recently flowed into the water-works intake. The stream from the mines was daily fouled by horses and men; and consequently, the water supplied to the general inhabitants was impure, and might cause a serious epidemic disease. The impurity of the water supply is a constant source of complaint; and the Board have now decided to obtain Counsel's advice as to the best course to pursue, and to request the Local Government Board to send an inspector to examine the water-works and the state of the surroundings.

The New Works of the Belfast Water Commissioners.—The Belfast Water Commissioners are at present actively engaged in carrying out a portion of the new works authorized by their Act of 1889. The works now being executed are the filter-beds at Forked Bridge, which are alone calculated to cost £40,000. They are situated about three-quarters of a mile below the Stonyford reservoir, and are intended to filter all the water coming from the Stonyford district. There will be four filter-basins in all; but only three of them will be kept in actual work, and the fourth one in rotation will be thrown out of use to allow of periodical cleansing. Each basin will have an effective area of some 2700 square yards; and the average rate of filtration will be about 500 gallons of water per square yard of area in twenty-four hours. With three filters at work, the total output will average 3½ million gallons of water, which is the total daily product of the Stonyford works, including a new reservoir about to be constructed at Leathemstown. It may be mentioned that the filters will be 9 feet deep and lined on the bottom and slopes with cement and concrete, and coped at the top. The total thickness of the filtering material will be 5 feet, beginning at the bottom with broken stones, and finishing at the top with fine sand.

The Proposed Purchase of the Maidstone Water-Works.—At the last meeting of the Maidstone Local Board, Mr. Cox moved, "That the offer of £130,000 having been declined by the Maidstone Water Company, for the purchase of the same, a further sum be offered." He remarked that, in dealing with this matter, the Board appeared to have made a mistake in keeping it too secret; and from a ratepayer's point of view, it was to be regretted that they had not made public the way in which they had arrived at the sum of £130,000. The paid-up capital of the Company amounted to £63,400; and this, with the loan of £6650, brought the total capital up to £70,050. The net water-rents received in 1887 were £7397; and the maintenance charges in the same year came to £2706—leaving an available balance for profit of £4690. Last year the water-rents amounted to £7694 12s., and maintenance charges £2816; thus leaving a profit of £4878. These figures, he thought, showed very clearly the working of the Company at the present time. The Company's capital was invested as follows: £26,600 in 2660 £10 shares, paying a maximum dividend of 10 per cent., and being worth, in his opinion, £25 per share, at which figure some of the shares had recently been sold. He also allowed £2 10s. for the compulsory sale of these shares; and this would make their total value £27 10s. per share, or £73,150 for the whole 2660. There were 2340 7 per cent. shares; and these, at £18 per share, should realize a sum of £42,120. Then came the 1340 10 per cent. preference shares at £14 10s. per share, which came to £19,430. There was lastly the loan of £6650, which the Board would take over if they purchased the concern; and this made the total sum, which, in his opinion, was worth £141,350. If the Board decided to purchase the water-works at this figure, they could borrow the money at 3¼ per cent., and extend the payment over a period of 60 years. Alderman Potter having seconded the motion, Alderman Waterman said he had hoped they had heard the last of this question; and he expressed the opinion that it would be better for them to leave it alone. In the course of further discussion, Mr. Tootell pointed out that Mr. Cox had joined in making the offer of £130,000 to the Company, which he then thought they ought to accept as the full value of the concern; but now he proposed that this offer should be increased by 10 per cent. in a month. An amendment referring the matter for further consideration to the Water Supply Committee was carried.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following progress was made with Bills last week:—

Bill read a second time and committed to a Select Committee, consisting of Lord Foxford (Chairman), Lord Boston, Lord Vernon, Lord Hatherton, and Lord Sudley; to meet on Tuesday, July 21: Keighley Corporation Bill.

Bill reported: Bognor Water Bill.

Bill read the third time and passed: Falmouth Water Bill.

HOUSE OF COMMONS.

The only progress to be recorded for the past week was in the case of the Northallerton Water Bill, which was read the third time, and passed.

THE METROPOLITAN WATER SUPPLY INQUIRY.

Twenty-first Day—Wednesday, June 24.

(*Before Sir* MATTHEW WHITE RIDLEY, *Chairman; Mr.* T. H. BOLTON *Sir* A. BORTHWICK, *Sir* H. ROSCOE, *Mr.* BRISTOWE, *Mr.* LAWSON, *Mr.* J. W. LOWTHER, *Mr.* MURDOCH, *and Mr.* ROWNTREE.)

METROPOLIS WATER SUPPLY BILL

On the resumption of the inquiry this morning,

Mr. BIDDER, on behalf of the borough of Croydon, asked the Committee, whichever way they ultimately decided—whether they legislated or whether they reported—to take care of the position of Croydon, and see that the protection which Croydon desired to have should be recognized and not forgotten. He explained the position in which Croydon stood with its independent supply and a small portion of the borough served by the Lambeth Company; and said that the first point he submitted was that it would be unreasonable to include them within the area of which the rates were to be pledged for the purposes of the new Water Trust if one was to be created. The second, that it would not be reasonable that the Water Authority should take any power to supply within the limits of the borough of Croydon; so that there should not be a possibility of a competition with the Local Authority which had provided for the wants of its own district. The third point was that, as regards that little fringe of the Lambeth Company's works which came within the borough of Croydon, assuming the Lambeth Water Company's undertaking to have been purchased by a Water Trust or a Public Authority, provision should be made that the borough should have the option of purchasing so much of the Company's undertaking as lay within their borough, at a price which the tribunal who settled the value of the whole Lambeth undertaking should say, as between Croydon and the Metropolitan Water Authority, was a fairly proportionate price. There would not be the slightest difficulty in adjusting a clause that would meet the case.

Mr. WORSLEY TAYLOR, on behalf of the County Council of Middlesex and the Corporation of West Ham, said the Committee had to consider whether they should legislate or recommend that there should be purchase first and inquiry after, which was the proposal of the Vestries, or whether there should be inquiry first and purchase afterwards, which was the proposal of the London County Council; and he proceeded to advocate that inquiry should precede purchase. There was no want of water now, and there was not likely to be for the next four or five years. Nobody could be harmed physically, therefore; and there would be no artificial rise in the price, at any rate until the next quinquennial valuations, which gave them four years to turn round and consider the matter. A rise in price of course there would be, because London was extending. But there would be no artificial rise; and therefore he failed to see how anybody could possibly be damaged. It was absolutely necessary, for the purposes of both London and the outside areas, that they should know the facts about the quantity and the quality of the Water Companies' supplies—what they had and how long it would last. Nobody wanted anything more than facts; and the mere eliciting of these by skilled engineers could not by any possibility affect the pockets of the Companies. He asked for absolute severance, and for the bodies he represented to have complete control of their own supply. Summing up his demands, he said that his clients wanted four things: (1) That inquiry should precede legislation; (2) that Middlesex and West Ham should have the right to take part in that inquiry, in some form or other; (3) that no more water should be abstracted from Middlesex than that which might be abstracted now for the purposes of either London or anywhere else; and (4) that power should be given to the outside authorities to join in the promotion of Bills, or to promote them for themselves. If the Committee assented to these propositions, he hoped they would involve the minimum of difficulty, and would most largely tend to promote a speedy, wise, and amicable adjustment of the matter.

Mr. PEMBROKE STEPHENS, for the Surrey County Council, said their interest in the matter was a substantial one; and it would be impossible to arrive at any really satisfactory settlement, if they did not, in any body which might be formed to deal with the matter, include direct representation of those interests. Looking to the position of Surrey—to its population, its area, and the ambit of the Water Companies that were in it—he thought he was moderate in claiming that it should have three members on the Authority.

Mr. MEYSEY THOMPSON, on behalf of the Beckenham Local Board, the Bromley Local Board, and the Bromley Rural Sanitary Authority, said that, so far as the Kent Company's district was concerned, all the Local Authorities were entirely in harmony, and practically were all prepared to unite in giving themselves an independent supply, if the Committee should think fit to grant them powers to do so. They were all in accord in asking the Committee to give them power to purchase their own undertakings, and also to put in clauses for their protection, which, at the proper time, he should submit to the Committee. He as ed for representation at the preliminary inquiry, which he thought would result in agreement with the London County Council, who had always met them in a perfectly fair manner. The Kent district differed

from almost all the others in that it actually contained certain reservoirs, pumping-stations, and so on, which were used, or might be used, for the supply of the outside district, without taking any independent supply from anywhere else. Although they had frequently made inquiries as to the possibility of supplying themselves, they had always been met by the preliminary difficulty that there was already a parliamentary Company there who were, and professed themselves to be (and he made no charge against them for not doing it efficiently), ready and willing to give them a supply. He asked the Committee to affirm the general principle, which was not really in dispute—that, so far as possible, every district should have the control of its own water supply, and that the Water Authority which should supervise that supply should be not the County Council, but the Sanitary Authorities, whom, throughout the whole history of such matters for very many years, Parliament had invariably entrusted with such duty. With regard to the right to take water from the Kent district for the use of other parts of London, as authorized under the Bill, he submitted that, even if it were proved to the Committee that there was a great deal more water than was at present necessary, it would not be right to authorize the Water Authority to take it without being satisfied as to what the probable increase of population would be, and also as to the details of the various underground streams and springs, and as to whether the removal of a very large quantity of water might not be attended with grave danger to the district. He objected to the rating powers in the Bill for an additional supply for London proper. So long as they remained as they were, it was not likely that their present rates would be increased. The water was obtained from the district; it was procured cheaply; it was excellent; and it was sufficient for, at all vents, ma ny years to come for the needs of the district.

Mr. C. E. Baker, Agent for the Dartford Local Board, the Dartford Rural Sanitary Authority, and two or three other bodies, said he desired to confirm what Mr. Meysey Thompson had said.

Mr. Clarke Williams, on behalf of the West Kent Main Sewerage Board, said that the Board were large consumers of water; but it was not on the ground that they were interested or prejudiced in regard to this matter that they appeared before the Committee. The reason was that they were a statutory body representing the whole of the Kent Company's area outside the Metropolis; and they were able and ready to become the Water Authority for that district. The Local Authorities were quite willing to combine; but, pending combination, they were agreed that the Board he represented should be the Water Authority. If the question was ripe for London, it was ripe for Kent. The thing could be done at one stroke; and the same inquiry which determined the purchase of the undertaking of the Kent Company, and the terms on which it should be effected, could separate the two parts, and give to the Kent district their part, and take the intra-Metropolitan portion for the London County Council. Croydon, Richmond, and other places had had separate autonomy conceded to them; and he asked that it should also be given to the West Kent district, and that they should have the power to promote Bills in Parliament in relation to the subject.

Mr. Giles, on behalf of the Wimbledon Local Board, said that the district was served by the Lambeth and Southwark and Vauxhall Water Companies, each of which had their intake at Molesey. Therefore it was a case in which they should be dealt with by supply, either in detail or in bulk, and not one which could be treated by severance. He did not oppose the principle of a Central Authority, nor was he in antagonism with the Water Companies, as the Board were sufficiently satisfied with the quality and quantity of the water served to them; but he asked that they should be represented on the Water Authority through the Surrey County Council, as they would be interested in the settlement of the price to be paid for water in bulk, or in the rents to be charged within their district.

Mr. Balfour Browne, for the Thames Conservancy, said that, except for some rather hasty and ill-considered observations by Mr. Binnie, he did not think he would have had anything to say, as the Committee had declared that there was no allegation against the Thames Conservancy, and that practically there was nothing whatever to answer. Since then, however, certain things had been stated in the evidence given on the part of the County Council which would be injurious to his clients if they remained without contradiction or explanation. First, he wanted to get rid of the misapprehension that the Thames Conservancy was the vendor or seller of water to the Companies. Nothing was farther from the truth. The money received from the Companies was not in any sense a payment for the water which they took, but simply for some important duties which they performed with reference to the purity of the water—the scavenging of the river, and other things which were really to the advantage of the water consumers of London. The interests of the navigation and of the Water Companies were one. In consequence of the action of the Conservancy, the health of London had enormously improved. With regard to zymotic diseases, which were properly attributable and traceable to water, the result was startling. Since 1881 they had been doing a great deal in diverting the sewage from the river; and at the present time they did not know of any real access of sewage to it. In 1881 the deaths in London from zymotic disease amounted to 6946; but in 1890, when the population had greatly increased, they were only 5747. Comparing the health of London with that of 28 great towns throughout England in 1889, with a population of 58·3 to the acre, the death-rate was 17·4; while in the 28 towns, with only 38 people to the acre, it was 19·3. Was that a bad account of London water? Some of Mr. Binnie's evidence was calculated to give an entirely erroneous impression. He had stated that there would be the greatest difficulty in constructing reservoirs in the way pointed out by the Duke of Richmond's Commission for supplementing the supply for London above the intakes; but the Conservancy had gone into the matter with considerable care, and they were instructed that it was perfectly feasible to do this, both from an engineering and from a geological point of view.

Mr. Littler, on behalf of the City Corporation, said that that body was in perfect accord with the County Council, and concurred in the view that the rights of the outside Authorities should be duly respected. He was anxious that no false step should mar the undertaking from the beginning, but that it should be solidly, steadily, and carefully commenced; and he had very little doubt that in a shor period the whole matter might be arranged on satisfactory lines, and probably on lines that would require little more than the sanction of Parliament.

Mr. Pember, for the Grand Junction and East London Water Companies, remarked that a good deal of what he had to say would be applicable to the Water Companies generally. Into the composition of the proposed Water Authority he did not care personally to enter, but left the Vestries and outside Local Authorities to fight their own case. In the first place, he would make a statement which might astonish a good number of people, but which was not the less an absolute fact—viz., that the case of the Water Companies, as modern institutions, had never been heard by Parliament. No statement whatever of the way in which the Companies conducted their business, or of their constitution and environment, had ever been made since 1852; and on that occasion, when they were thoroughly heard, Parliament gave them all their modern powers. They were unwilling to sell, but they were not unwilling to discuss the question of sale; and although the terms agreed upon were not satisfactory, they were willing to accept them for the purpose of quiet, and to get rid of the whole question. The provisional agreement having been made, there was not the slightest occasion to put the case of the Water Companies before Parliament then; and it was not put. The Companies were now ready to state their case as fully, fairly, and frankly as it could be stated, if the Committee would hear it. They were ready to call evidence on every relevant topic, with a view to show that they had done their duty in the past, and were able and willing to continue to do it, if they were only left alone. Further, they were ready to insist and to prove that, if they had made occasional lapses in duty or in judgment, the various statutes, public and private, which formed their environment, afforded abundant materials for their control, their punishment, or their reform. All this they were ready to show to the Committee. But he must ask this question: "Will you allow us to do it, and to do it thoroughly?" for it was of no use doing it if they did not do it thoroughly. It was useless to put before the Committee two or three isolated facts. The whole story must come out, if anything was to come out at all. To do this they must first show the physical condition of their undertakings, to get rid of the suggestion that the works were either faulty or obsolete, that their capital had been wasted, and all the rest of it. Then they must give evidence as to the sufficiency of the supply, its quality, its cheapness; and, finally, as to the possibility of its expansion in the hands of the Companies. This the Committee had said they would not let them do. Yet without this he asked, in all seriousness and earnestness, how could they determine whether the extinction of the Companies was, in the first place, just; and, secondly, whether it was advisable? How could they judge of the expediency of abolishing the Companies without having elicited the facts of their existence? He knew that a great cry had been raised against the Companies and their conduct, with, he thought, but little cause, and originally by a small and not very important group of persons. That cry had been echoed continually, widely, and irrationally, so that folks had come to say that the Companies must be got rid of. It was very easy for people to make up their minds, if they heard only one side of the story; and he could readily conceive that the ratepayers would to a man say, "Get rid of the Companies," if the only story they heard was that they would then have water of a perfectly fabulous beauty for a fabulously low price. He asked anyone to frame an indictment against the Companies in black and white; and if he could do so, it would be perfectly impossible to support its counts. Everyone had admitted that the Companies afforded a good supply of water. So far as the Committee had heard (and he would prove it abundantly if allowed to do so), the Companies were not in default; and if they were not in default, then he said they ought not to be extinguished. Certainly, they ought not to be competed with, for the injustice of the competition was far worse than that of extinguishment. He maintained, and quoted precedents, that Parliament had never given the supply of water to a corporation, without contemporaneously providing for the purchase of the existing water company. The injustice of any other course would be too flagrant. The result of permitting competition between a company and a corporation, with all the rates at their back, could only end in the ruin of the company. The unvarying course of legislation had been to give a monopoly by common understanding, or, as he would call it, a monopoly *subditum*. It embodied the principle that, so long as there was a company, the local authority should not compete; and it provided also the converse of the proposition—that, if they insisted upon having a supply of their own, they should buy out the company. Parliament had never sanctioned competition in water; it had never treated it as a commercial matter, to be dealt with according to the laws of supply and demand. The overlapping of one or two of the districts of the London Water Companies was no exception to this invariable rule. He was not aware how it arose, but it was only to a very small extent. Whether it arose from accident or design he did not know; but, however it came about, it was abnormal, and Parliament had since put it right by approving of the agreement of the Companies to prevent competition. On that understanding, of which all along Parliament had been fully cognizant, they had spent many millions of money. Parliament had sanctioned that expenditure from time to time, and even encouraged it. He could show that they had even been threatened—not by Parliament, but by outside departments—if they did not incur that expenditure. But whether sanctioned, encouraged, or threatened, the Companies had always incurred the expenditure on the understanding of which he had spoken, and of which Parliament had been as fully aware as the Companies themselves. If they were liable to competition, why were their dividends limited? Parliament did not restrict the dividends of Railway Companies; but their charges were limited. So were the charges of the Water Companies. But within their maximum charges, the Railway Companies were at liberty to make what profit they liked or could. The reason of this was that it was believed that competition would protect the public. This was the theory of railway enterprise in England; but, by parity of reasoning, the dividends of the Water Companies were limited because, in their case, Parliament did not mean to protect the public by competition. There would not be the slightest need for the limitation of dividends

if Parliament had intended to let anybody come and compete with the Companies in the event of their making too great profits or too high charges. He admitted that there was a growing feeling here and there—and everywhere, if they liked—though he did not think it was in all cases perfectly well based, that municipalities should have the water supply in their own hands. But Parliament had invariably protected the companies to the extent of declining to connive at their ruin by not providing for the purchase of their works at the time that it allowed the municipality to take the supply into their own hands. Sir W. Harcourt's Committee not having taken the thing thoroughly into their impartial consideration in a judicial manner, and not hearing all the case of the Water Companies for and against, worked, in his humble judgment, a reversal of the whole policy of Parliament, so far as they could do so, in the report they made. That Committee recommended upon very slight grounds, and after a very insufficient investigation, an absolute reversal of the whole policy of Parliament; and a very serious reversal too—one which hit expediency hard, but justice ten times harder. Why should it be suggested to Parliament at this moment that they should reverse the just and equitable principle of action which they had hitherto adopted, to the detriment of the London Water Companies and of so large a section of the investing public? The only speciality of the case was that those Companies were doing their business better than any extinguished company that they ever heard of. The only real excuse for the suggestion of the County Council in favour of such a reversal was that they were staggered by the magnitude of the financial side of the transaction, on which, otherwise, their fingers itched to embark. The Companies could not help that magnitude; indeed, it formed, in his judgment, a very sensible reason for leaving them alone. The thing was altogether too big; a change of this kind in an infinity of cases, and when the amount involved was large, was something that had better be left as it was, especially as no harm, but good would result from doing so. But then it was said: "Oh, yes; but the money side of the transaction has become so great because the Companies' capital has been unduly inflated." It was not so, even judged by other great instances in the kingdom. The money value of the Companies, as they estimated it, was not by any means out of proportion to the population supplied, which was now more than 5,500,000. Liverpool had a capital expenditure of upwards of £4,000,000 to a population within its area of some 800,000. Manchester had, or would have when the Thirlmere works were finished, a capital expenditure of £7,000,000 to a population of something less than a million. The population of London was seven times that of Liverpool, and about five times that of Manchester. The capital value, therefore, of the London Companies was not excessive. It seemed to be forgotten that, in buying the undertakings, they would at the same time be buying a vast income. There being nothing special in the case of London which did not exist all over the country in greater or less magnitude, why, he asked, was there all this demand for preliminary inquiry? Other corporations had not had it. In every case of compulsory purchase, the same questions had been, and were, involved—questions as to the physical conditions of the works, as to the efficiency of the supply, as to the necessity for future expenditure, as to the dividend rights, and as to prospective value. All these questions had cropped up in the country from time to time, and had every one been capable of settlement. All the contention of the Companies was that purchase must be a condition precedent to supply whether for £5 or for £50,000,000, or whatever the works might be valued at between these two figures. Settle the question whether or not there should be instant purchase, and certain inquiries would follow as a matter of course by the Arbitrators. The question was whether the Committee would allow the Water Authority to have an independent supply without previously buying out the Companies; and no further inquiry was wanted to settle this. Everything else was a question of detail; the price, the terms, and the conditions would be looked into by the Arbitrators. The question that purchase should be antecedent to authority to supply involved a question of policy which Parliament could, and ought, to settle, and which hitherto it had always settled in one way, and in a way which it ought to adhere to now and always, for it was the only just one.

Twenty-second Day—Thursday, June 25.

Mr. PEMBER, resuming his address, referred to Mr. C. Harrison's plea for postponement until the question of the taxation of ground-rents had been dealt with, and observed that, whatever might be its relevancy to the present matter, it merely showed that the whole inquiry was premature. If nothing could be done until that question was settled, they had all better leave the room. Passing on to the proposed inquiry, he said that it involved not merely a question of value, but one of policy, which Parliament could and ought to settle, and which it had always settled in one way, and a way to which it should still adhere. Mr. Moulton had narrowed the functions of the Royal Commission to two points—(1) How long the present supply would last, and (2) where they should turn for a new supply; but he intimated that the new Water Authority would not be bound by the findings of a Royal Commission on the latter point. Of what use, then, was a Royal Commission? With regard to the length of time that the present supply would last, a Board of Arbitrators could take evidence to the fullest possible extent that would be needful with a view of seeing how far the possible or probable exhaustion of the present supply told upon the value of the Water Companies' undertakings; because this would be the only question to which it would be relevant, if they were discussing what ought to be paid to the Companies. If this was the limitation of inquiry by a Royal Commission, then a Commission was not wanted, because it was certain no Royal Commission would sit to determine a point about which it was told that its conclusions would go for nothing. If, however, the Water Authority were to hold the inquiry, he asked: Is that Authority to settle whether it should buy or not? If it was to collect facts for the purchase, this could be done without any parliamentary powers. But if the thing was to go farther, and if, by holding an inquiry in connection with the arbitration to come, they meant that the conclusions of the Water Authority holding the inquiry were to bind the Arbitrators, so that the facts which the Authority chose to call "proved" were to be accepted by the Arbitrators as proved, how monstrous this would be. They would be the buyers and one of the parties to the arbitration; and it was outrageous that they were to form conclusions which were to be accepted by the Arbitrator himself. How could the Companies be expected to further such an inquiry, if this were its object, and if this were to be the result? Of course, they would decline to take part in it; and if they declined, would the Committee force them into it? Reviewing the only possible object which these inquiries were to have, he said they did not want legislation; but if they did, then they were subversive of every principle of justice, so far as they had any effect at all. The course of the Committee was perfectly clear—viz., to make the purchase of the water undertakings the condition precedent of the assumption of the powers of a Water Authority. Then, in the sense of getting up their case for the Arbitrator, they might make what inquiries they pleased. It would be for him to judge of the result of those inquiries, and to expose the truth of the result in the figures of his award. If they persuaded him that the Companies' works were a failure, or that they were obsolete; if they persuaded him that the capital had been partially wasted, that the dividends had been unfairly paid, or unfairly earned by an improper exercise of powers; if they were able to show him that the dividends could not arise in future, or that there was imminent or remote danger of their falling; if they could persuade him that the capital account would be liable to unprofitable expansion—if they could do this, then the price to be paid for the undertakings would be proportionately diminished. The tribunal that determined the amount should be the tribunal to judge of the facts that led up to it and the value of them, towards whichever side they might tend. As to the personality of the Board of Arbitrators, he cared not how they were chosen so that they were selected impartially, of the best men, and of an uneven number; and he confessed that he knew of no better machinery than that of the Lands Clauses Consolidation Act. He could not help thinking that any three good men, carefully selected from the very wide field of choice which lay open to the Companies and the Water Authority, and an Umpire to the Arbitrators themselves when carefully selected, would be a good tribunal; and, in his opinion, they could not do better than take the Lands Clauses Act. If the tribunal were made too large, there would be a good number of fancies to be aired.

Mr. BOLTON: Do you suggest that the whole question should be left for arbitration under the Lands Clauses Act, without any direction by Parliament as to the principles to govern the arbitration, or the considerations to be entertained by the Arbitrators in this special case? Do you also suggest that the Lands Clauses Act was ever intended to apply to an arbitration of this character?

Mr. PEMBER said, to answer the honourable member's last question first, he did suggest that that Act was intended to apply to an arbitration of the present character. As to the instructions that should be given to the Arbitrator, he would say give none. It would be impossible to make the instruction exhaustive. No man could say, until he came to sit as an arbitrator in a matter of such complexity and such magnitude as this, exactly what subject-matter was or was not relevant to his inquiry. Then again, if they would excuse him for saying so, it would be almost impossible to avoid making them one-sided. Would it be fair for the Arbitrator to consider the fact that the supply might prove short, or that it might, from circumstances beyond the control of the Companies, deteriorate in quality or in quantity, without considering what the Companies might do to put that right; and, further, if that were adjusted, how long they might go on getting their full parliamentary dividends? In other words, would it be fair to tell him that he was to take into consideration prospective deterioration, but was not to regard prospective value? He would therefore say: Choose the best men; and when you have chosen them, do not tie their hands, let them do justice all round, and take everything into consideration. He asked if there was anything special in this matter except its magnitude. He quite admitted that there might be reasons which would make Parliament pause, and also make the London County Council and the Corporation pause, before they first sanctioned, and the others accepted the sanction, of the embarkation of the public of London upon so vast an operation as the purchase and the management of the supply of water to the Metropolis. In that respect it was special; and the thing had gone so far that they had better leave it alone. But the question as to what they were to pay for each separate water undertaking when they came to purchase it, contained nothing special whatever. It was a mere water undertaking with a capital of a certain number of millions of pounds. There were eight of these undertakings; but there was not a single special factor in any one, except the New River Company, which took it out of the ordinary category of cases with which arbitrators had to deal. That Company was in a peculiar position, in consequence of their early constitution and their charters, as landowners, and the fact that the proprietors were not shareholders in the ordinary sense of the word, but were co-partners and co-owners of real estate. This was a special matter. But even this would not take it out of the hands of an ordinary arbitrator, if he were a properly chosen person; for when any legal matter arose, he could have a legal assessor to advise him upon the legal point. This was all he need say at present upon the question of arbitration. Upon the hypothesis of the extinction of the Companies, this was the only topic, except one, which would be of the slightest interest to the Companies; because if they were to be bought and extinguished, there would be an end of them. But there was one matter which he hoped the Committee would take care about in any report they made to Parliament, should be carefully and earnestly considered, and that was with regard to the situation of the officers and servants of the Companies after their extinction. There was no doubt that they were a very able, a very large, and a very conscientious body of men, who, in their different capacities, had served not only their employers, but the public well; and he was sure that he would appeal with success to Parliament when he suggested that their interests should be thoroughly taken care of. In many respects the Bill of the Vestries would not do this in a satisfactory manner.

Mr. LAWSON: At the present moment, have the servants of the Water Companies pension rights or arrangements?

Mr. PEMBER said it appeared that some of them had; but no doubt before the Committee reported, they would take care to inform themselves very carefully of the facts upon this point.

Mr. BOLTON: Why should they not be taken over?

Mr. PEMBER said that, in the first place, there was nothing to guarantee that they would be taken over. At all events, their interests should be safeguarded, either by pension or in some other way. All that he had said up to the present had been upon the hypothesis that the Committee were acting, or intending to act, upon a foregone conclusion; but before he sat down, he must put the question: Is it too late to ask Parliament to pause in this matter? He urged this with greater confidence because the Chairman of the London County Council (Sir John Lubbock) and the Chairman also of the Middlesex County Council (Mr. Littler) had admitted that, in all probability, it might be well to leave the Companies alone. Therefore, having the sanction of these two important voices, might he not venture to point out the magnitude of the money transaction upon which they were apparently on the eve of allowing the community of London to embark—its magnitude, that was to say, if it was to be carried out upon an honourable basis, and confiscation apart? He asked the Committee to think of the enormous addition that the water management would make to the labours of the London County Council. There was, further, the cost of the management; and surely he might ask Parliament with some force to consider whether it was worth while to make up its mind, without taking evidence upon the subject, that the community should embark on so vast an undertaking. He would suggest, although it might seem to sin against what the Committee had said was their early and preconceived determination, that it was certainly feasible, and probably preferable, to let the Companies exist under a carefully organized *régime*. Such a *régime* existed now, if only people knew it, and if they would only, as occasion arose, put it into execution, and it might be amplified if the Committee thought it needed it. The obligations as to the present supply, and even as to increased supply if necessary, were far more comprehensive than most people imagined. The public control, under the Public Health Acts of 1852 and 1871, extended to new sources of supply; to the quantity and quality of the water; to the power to insist upon a constant supply; to a careful supervision, regulation, and alteration, if necessary, of the bye-laws of a Company as between that Company and their customers; and in the fullest way to questions of audit and of financial control generally. As to the future expenditure of capital, he suggested that the Companies could raise the money as cheaply as the County Council; while as to compelling an additional supply, the present law would do all that was required. If the Committee were to resolve that the Companies should continue to exist under the present *régime* (improved or not as they might think it required improvement or amplification), he suggested the propriety of Parliament encouraging amalgamation, wholly or partially, among the Water Companies, as it had done among the Gas Companies, when it settled in favour of the permanent existence of those Companies under certain control. Some such solution of the situation as he had pointed out would have many advantages. In the first place, justice would be done to the Companies. Secondly, a vast and somewhat difficult financial transaction on the part of the community of London would be avoided. Thirdly, much public time would be saved, and many dangers of maladministration would undoubtedly be avoided. Fourthly, the Companies would be really administered in the public interest; and, further, the increase and improvement from time to time in the water supply would be assured on terms as economical as those on which the public could obtain it for themselves. He concluded by formally tendering on the whole subject—and the Committee would, of course, do with that tender what they thought fit—the fullest possible evidence on all topics which were relevant to the issue he wished to put before them—viz., that the Companies had done their duty to the public in the past, and were willing and able in all respects to continue to do it.

Mr. BALFOUR BROWNE said he proposed to address the Committee on behalf of the Lambeth Water-Works Company and an Association of Provincial Water Companies, who were afraid that, if the Bill passed, it might be a precedent for the compulsory purchase of all the water undertakings throughout the country. If the Committee were prepared to deal with this question purely as a London matter, and say that it was not to be looked upon as a precedent for the purchase of water undertakings throughout England, he would be relieved from saying anything on their behalf.

The CHAIRMAN said that the general question of purchasing water-works throughout England had not been referred to the Committee, who had only to judge of the question of the purchase of the undertakings of the London Companies. He did not see how the Provincial Companies could be prejudicially affected.

Mr. BALFOUR BROWNE (after consulting with his clients) said that, under these circumstances, he could relieve the Committee of any observations so far as the Provincial Water Companies' Association were concerned. On behalf of the Lambeth Company, he said they had tried to do, and he believed had succeeded in doing, their duty to the water consumers. Their sources of supply were ample, not only for the present wants of the district; but even if the rate of increase should continue in the next, as it had done in the past 20 years, there was sufficient for 25 years to come. Dealing with the precedents for compulsory purchase, he said the only ones that were even colourably compulsory were those of Stockton and Middlesbrough, Cheltenham, and Sheffield; but in each of those cases, the Company themselves took the initiative in coming to Parliament. They were not able or willing to undertake the provision of a future supply; and Parliament said that consequently the rights of the Corporations had arisen, and on that ground the works were transferred to them. The Lambeth Company was not in this position. They had water and works for the next 25 years; and they did not come to Parliament to ask any favour. They only asked Parliament, now that they had been brought there by compulsion, to be left alone. The Manager of the Company was present, and he would prove the facts as to the large sources of supply possessed by the Company; he would also prove that there had been no complaints, and that the Company had done their duty to the public. He tendered his evidence if the Committee wished to hear him, though he did not force it upon them; but if, either now or at any subsequent stage, the Committee desired that he should be called, he could give evidence upon those subjects.

Mr. GERALD FITZGERALD, on behalf of the Chelsea and West Middlesex Companies, said he should support all that had been said by Mr. Pember on behalf of the Water Companies generally; making only a few observations as to the special features of the Companies he represented. The Chelsea Company were in the unique position of having their district wholly situate within the Metropolitan area. Under the Act of 1875, they had power to take from the Thames a quantity not exceeding 20 million gallons in any consecutive period of 24 hours; that which at present sufficed for the supply of the consumers being about 9½ million gallons. If the whole district were built over, it was estimated that about 13 million gallons would be sufficient to supply the utmost possible requirements. Already the Company were either paying, or were on the verge of paying, their maximum statutory dividends; so that any increase in income would at once go in reduction of rates to consumers—at all events, as soon as any questions as to back dividends were settled. The plant was in an admirable condition; and it would be obvious to the Committee that the undertaking, as a whole, represented one of the most valuable properties among the eight Metropolitan Water Companies. Referring to the West Middlesex Company, he said that, by an Act passed in 1866, they had also the right to take a quantity of water not exceeding 20 million gallons from the Thames. He would say nothing as to an agreement with the Conservators, under which he believed they had a right to abstract 4 million gallons more, because he preferred, for his present purpose, simply to rely on the statutory rights of the Companies. The West Middlesex was formerly an unprosperous concern, but now it was exceedingly successful; for not only were the Company paying their maximum statutory dividends, but had satisfied claims for back dividends, and had commenced allowing to their consumers a discount or rebate from their authorized charges, amounting to 7½ per cent., with a prospect of an increase in the future. He had only to make one general observation in conclusion. Private enterprise and private capital were what had made London habitable. They lighted London, and they gave London a supply of water, when local authorities were either non-existent or contemptible. The original shareholders must, in a majority of cases, have been losers rather than gainers by their venture. Existing shareholders were, in every case, a body of people who, with probably very few exceptions indeed, had bought their shares at a large premium, and were content to accept a comparatively low rate of interest on account of the security which parliamentary investments had always been supposed to confer. To destroy or to depreciate this property by legislation, directly or indirectly, would be an act of injustice, which even the ratepayers, who might be supposed to benefit by it, would, if they were in possession of all the facts of the case, be inclined rather to resent than to support. He suggested also that full knowledge of these facts might lead the ratepayers to the conclusion that their true interest lay at this time in exacting from the Companies the performance of the duties and the discharge of the responsibilities that Parliament had laid upon them, without themselves undertaking the gigantic financial burden and the stupendous administrative task of supplying 5,000,000 people with water.

Mr. LEWIS COWARD, on behalf of the Kent Water Company, said this undertaking also occupied a somewhat unique position; and it would be unnecessary for him to ask that its interests should receive careful consideration at the hands of the Committee. He hoped they would pause before they reported, in connection with the Kent Company, that it should be put on the same footing as the other Companies. By an Act of 1809, the Company acquired certain works, which had been established under the authority of a Royal Charter granted by William III. in 1701 for a term of 500 years, for the supply of water in Greenwich, Deptford, and the neighbourhood. These privileges were granted by the Crown as owner of the property; and in return for them, the Company paid the not too modest sum, in those days of £65,000, which was equivalent to something like 30 years' purchase on the gross income of the undertaking. This was his title-deed; and he objected very strongly to its confiscation. The district of supply extended over 177 square miles, of which only 30 were in the Metropolitan area. There were 554 miles of pipes; and the district stretched as far down as Gravesend and Westerham. No part of the supply was to London proper, but it was mainly rural. The amount of share capital was about £858,000. For many years the Company paid no dividend at all; for upwards of 50 years the average dividend was about 1¼ per cent.; and for more than 70 years it was about 3¼ per cent. But now they were paying their maximum of 10 per cent. The water was admittedly the best that was supplied to London, though Mr. Binnie had tried to discount that statement by suggesting that it might become contaminated. Such suggestions ought not to be lightly made; and it turned out that the only ground for them was that the Board of Works had laid a sewer alongside one of the Company's wells, and that then the Company immediately closed the well. As to quantity, the present daily supply was 12 million gallons, obtained from the chalk by means of six pumping-stations; the present population being about 450,000. From the Company's sources of supply, it was admitted that 55 million gallons of water a day could be obtained, which would suffice for a population of 2½ millions; and the Committee could imagine how many years it would take before the population grew to this figure. There had been no desire expressed by the inhabitants or local bodies for a change in the existing arrangements; but, on the contrary, throughout the district they preferred that the Company should supply them rather than that they should supply themselves. When the Committee decided that they were not going into the question of water supply, he asked how they could say that anything was to be done with the Kent Company, for the purpose of legislation, unless they went into questions of engineering and matters of great detail and delicacy? It was admitted that the water was excellent, the supply ample, and the rates reasonable; and this being so, why could they not leave well alone? It was clear, if they were to legislate on the lines proposed by the Vestries, or by the County Council and the Corporation, that they would not legislate in a manner that would represent or command the confidence of the water consumers in Kent.

Mr. LOWTHER: You do not urge that severance between the London portion and the outside portion of the Company's district is impossible? It is physically possible, I suppose; but it would be a matter of enormous cost.

Mr. COWARD: It is a matter of enormous cost; and my argument is this: Divorce the Kent Company from all the other Water Companies, for we are not a Metropolitan Company.

The CHAIRMAN: What is your case, because no case has been made out against the Kent Company?

Mr. COWARD: My case is to be left alone, and to have no legislation at all.

The CHAIRMAN: To be dealt with specially? Suppose the Committee were of opinion that there should be a purchase of all the water-works, you want to make the case that you should be dealt with exceptionally from the other Companies.

Mr. COWARD: To be absolutely excepted from the control, as suggested, of the London County Council, and to be left as we are. That is our case.

Mr. BRISTOWE: You have rather a large area inside.

Mr. COWARD: I am aware of that; and that is why I wish to call my evidence.

Mr. RICKARDS: Not a bit of it. There is no issue between us now about the Kent water.

The CHAIRMAN said the Committee had already stopped the giving of evidence as to the quality and quantity of water; and they were not prepared to take such evidence then. He thought there was no injustice done to the learned Counsel.

Mr. COWARD then said he would retire under the direction of the Committee.

The CHAIRMAN: Only upon that point. If you desire to produce any other evidence to show that the Kent Company ought to be exceptionally treated, in the event of the Committee recommending to Parliament that the whole of the undertakings should be purchased, apart from the questions of the quantity and quality of the water, the Committee are prepared to hear it.

Mr. COWARD: Of course, the quantity and quality of the water are very important factors in support of our case.

The CHAIRMAN: The Committee are quite willing to take the statement you have made in your speech, without your supporting it with evidence. Of course, if you think your clients are prejudiced by not being heard, subject to the limitation I have stated, we are prepared to hear your evidence.

Mr. COWARD asked for time to consider the matter.

The Committee then adjourned for a short time. On re-assembling,

Mr. COWARD said he did not think a partial examination would be at all satisfactory; and he would therefore refrain from calling his witnesses. He further wished to say that three-fifths of the quantity of water supplied by the Kent Company inside the Metropolitan area was pumped from the outside; and if the Local Authorities were to have the control of the external sources, serious difficulties might arise with the new Authority, as to where it was going to get its supply from. He would only mention one other point, which was that the results of the quinquennial valuation, so far from indicating an increase to the Kent Company, showed a net reduction of £321 in the water-rate.

Mr. BIDDER, on behalf of the Southwark and Vauxhall Water Company, said that he must at once absolutely repudiate the suggestions which had been rather faintly thrown out that the Company were either at the end of their resources or somewhere near it. The facts relating to their supply had recently been laid before the Committee; and the Company were doing their duty satisfactorily to the public, and supplying a very high quality of water at extremely reasonable rates. Of course, if public reasons or public expediency rendered it necessary that the undertaking should be acquired by a Public Authority, they must bow to that expediency; but he confessed that as there seemed to be a good deal of doubt in the minds of most men as to whether, after all, the public would be in any way gainers. If, however, Parliament had made up its mind upon the subject, well and good. His own feeling was that it would, no doubt, result in a certain glorification of the London County Council; but it would also result in an increase in the cost of the water supplied to the ratepayers and to the consumers. The proposal for a preliminary inquiry, with a view to manufacturing evidence for the purpose of cutting down the value of the undertakings when they came to arbitration, was a suggestion such as he ventured to say had never before been submitted to Parliament. He asked the Committee to consider the inherent fallacy that was at the bottom of the idea. Supposing it were true (which he did not for a moment admit) that the Companies, although they had sufficient water to supply the present population of London, had not enough for the population that was coming in the future, what had this to do with the present value of the undertakings? How did it depreciate the value of the present undertakings? Supposing that the Southwark and Vauxhall Company supplied efficiently the existing population, and made £50,000, or £20,000, or whatever it was, net profit, was this worth a penny less because, in order to meet the wants of another 100,000 or 200,000 people when they came, the Company would have to apply to Parliament for authority to go somewhere else for a new supply? The proposal that they should receive less than their undertaking was worth—less than its market value—because they were only adequate to meet the wants of the present population, was to his mind utter nonsense. If they had made up their minds to have a public Water Authority, they must begin by buying the undertakings of the Companies; and if they could not agree as to the price, then the matter must go to an independent tribunal—to Arbitrators—who would hear all the evidence on either side, and before whom the Company would be bound to lay the whole of the circumstances and condition of their property, and who would have to take into consideration every element as to future supply and efficiency of supply, and then say what was fair between the Companies and the Water Authority. What useful purpose would a Statutory Committee serve in the meantime? He urged that the acquisition of the Companies' works must be simultaneous, so as to prevent the Authority using one undertaking to compete with another, and thus lower the price of those remaining to be purchased. He pressed, on behalf of the Southwark and Vauxhall Company, as emphatically as he could, the uselessness and the injustice to the Water Companies of the proposal of a vague roaming Statutory Committee, with powers of general inquiry which, it was very obvious, were only intended to be used for the purpose of beating down unfairly the value of the Companies' property.

Mr. POPE, on behalf of the New River Company, said they agreed in the main with the views entertained on this question by the other Companies. The actual position of the Company he represented was a very different thing, however, from that of an ordinary water company, which was an association of shareholders holding a common interest in an undertaking, and who would be capable of receiving so much in proportion to their share of any purchase-money which would be available for that Company. The New River Company was a special undertaking. It was a Company of proprietors of the New River, not of shareholders in the New River Company; and the estate of the Company was treated as, and was, in fact, real estate, conferring upon its holders privileges and rights just as any other class of real estate. The difficulties of dealing with such a proprietary as that of the New River had hardly been considered by the promoters of the Bill; and at the earliest period of the inquiry, it became evident that the question of the purchase of the interest of the present suppliers of water in the Metropolis would be surrounded by difficulties which had been hardly estimated by those who had hitherto talked so glibly on the subject. He asked how much nearer they were to satisfactory legislation upon the water question to-day than they were when Sir W. Harcourt's Committee reported in 1880. The only step nearer was that the County Council and the City had agreed upon the constitution of some Public Authority. If the Committee considered the constitution of such an Authority desirable, he, on behalf of the New River Company, had not anything to say about it. In addition to what Mr. Bidder had stated, in the course of his address, with regard to the proposed inquiry, and which he adopted as his own expressions, he would say this—that all parliamentary precedent, all parliamentary practice, the express declaration of Parliament so far as it was set forth in the General Acts governing the supply of water, was that where there existed statutory companies able and willing to do their duty, and to afford a good and wholesome and plentiful supply of water, they were not to be disturbed in the exercise of their statutory power, either compulsorily or by agreement, without their consent. The whole history of legislation pointed to this as a parliamentary principle. With regard to the New River Company, anything like a failure of supply was out of the question. There were now available, in the hands of the New River Company, about 55 million gallons of water a day with an actual supply of 32 millions. This left an absolute surplus, enough probably for the next 50 years, irrespective of what might be gained by economy and increasing the existing works. Therefore there was nothing to inquire into, unless the inquiry was directed to cheapening the undertakings of the Companies, so as to make it worth the while of the Water Authority to buy them. On behalf of the New River Company, he might say he shared the feelings of the other Water Companies. He should not be a willing seller. He did not wish to part with his undertaking; but if Parliament said that, in the public interest, he ought to do so, Parliament had the right to deal with his property as it had to deal with all other property, for the general benefit, but subject always to the cardinal rule that it should be acquired at its fair value. He did not know what the Water Authority was to be constituted for, or what they were going to do. As to giving them power to purchase the water-works, that would be a useless power unless the Water Companies were included in the power to agree. Compulsory purchase was out of the question. He maintained that they could not get a step farther than the point reached in 1880, and that the end of this inquiry should be a report that no legislation being possible at present, the Committee had decided that no legislation should take place.

Mr. BULKELEY WILLIAMS made an application to be heard on behalf of the Local Board of Heston and Isleworth. They had presented a petition against the Bill, and desired to be heard; but the Local Board only came to a decision on the previous night.

The CHAIRMAN said it was too late for them to be heard now.

Mr. PEMBER remarked that it would be well that the fact should be put on record. He assumed that the Committee did not care to hear the evidence he tendered.

The CHAIRMAN: No; I think not. I believe the Committee do not see the necessity for it; and I do not consider that the Water Companies will be at all prejudiced by the Committee declining to hear such evidence.

Twenty-third Day—Friday, June 26.

Mr. CRIPPS, on behalf of the Walthamstow Local Board, said they did not wish to address any argument to the Committee, but they took up the same attitude as the other outside Local Authorities.

Mr. CRESSWELL, on behalf of the Heston and Isleworth Local Board, renewed the application made on the previous day by Mr. Bulkeley Williams to be heard on behalf of that body.

The CHAIRMAN ruled that he could not be heard, as the case for the Local Authorities had been closed some time before the Water Companies were heard, and the Committee could not now re-open it.

Mr. RICKARDS then proceeded to reply on behalf of the promoters of the Bill; referring to the course of the proceedings in the Committee, and the alterations which had been made in the Bill by the introduction of the Statutory Committee of the County Council and the Corporation, and the striking out of the supplemental sources of supply from Leatherhead and Rickmansworth. With regard to the financial part of the Bill, this, he said, had not been attacked, except in respect to the rate-in-aid being imposed upon the outside authorities. He concurred in the view expressed by the County Council and the Corporation that the greatest freedom of action and consideration should be given to the outside authorities; but he maintained that it would be much better to purchase the water undertakings first as a whole, and then give the authorities an opportunity of taking over the supply within their own district as the circumstances of the case permitted. He also concurred in the proposal for the appointment of a Royal Commission to determine the source whence the future supply of London should come; but he urged there should be no further delay in giving powers for acquiring

the existing water undertakings. Their market value was yearly increasing; and unless they were going to decide for ever that London should not follow the example of provincial corporations, but should always remain under the Water Companies, and be deprived of the advantages of amalgamation and unification, now was the time to dispose of the matter. He did not believe that any agreement would be come to between the County Council and the Companies. He did not think that the Companies would, except on adequate terms, agree to sell their undertakings; and if they did, Parliament would either reject the Bill and pigeon-hole the subject for another ten years, or else it would have to go into the arrangement to see if a proper price had been given for the pipes, the pumping-stations, &c. He asked the Committee to deal with this question: Are the Companies to be bought out or not? and to allow the other questions to be left to arbitration, with directions to the Arbitrators such as were indicated in the Bill. Mr. Moulton and Mr. Littler had said that to give the power to purchase compulsorily would prejudice the chance of agreement between the Water Companies and the Water Authority; but he should have thought that, with the compulsory powers hanging over them, and the chance, and almost the certainty, of an adverse decision if they were unreasonable in their demands, the common-sense view of the matter was that the Companies would be more willing to agree as to the terms on which they were to sell. All acknowledged that, sooner or later, the water-works must be purchased, and that the thing would not be complete until this was done. Admitting the principle, was it not, under the circumstances, much better that the principle should be expressed in a Bill and affirmed now, than that it should have to be affirmed hereafter? If it was not affirmed now, and they merely gave a power to buy by agreement, they must have further legislation. If the Companies refused to sell their property, they must have fresh Bills over and over again to sanction the purchase of their works; and in this way they would open the door to great delay and to considerable expense. This must be met (if the County Council conducted the operation) at the cost of London. The expense would be not only on one side, but the costs of the Water Companies must be paid in fighting such a question, and must ultimately come out of the pockets of the consumers, because the possibility of a reduction in the price of water, such as had been carried out by the West Middlesex Water-Works Company must be postponed. So that, in whatever way they looked at the question, it meant expense and further litigation, whether before Parliament or in the Courts; and this would mean additional loss to the ratepayers of London. The learned Counsel reviewed the position taken up by the outside authorities, and criticized at great length the evidence which had been given by the County Council; and he again urged that there should be no further delay in dealing with the matter. In conclusion, he said the Bill was conceived in the public interest, and, whatever defects it had, it was framed as far as it possibly could be in such a way as to be just and reasonable to all parties. It had been an attempt to hold the balance between the ratepayers on the one hand and the Water Companies on the other. It was an honest attempt to make legislation on the water question possible for London, and to make it equitable. It was promoted by the Vestries at their own risk—not in the spirit of busybodyism, but with an eye to the good of London, and in their capacity as local sanitary authorities; and he respectfully asked, whatever might be the result of the inquiry—whether by legislation or by report—that as the introduction of the Bill deserved consideration, and its object had been to promote the interests of London, the cost of the Vestries in this matter should be borne by London itself.

The Committee conferred in private for a short time. On the re-admission of the public,

The CHAIRMAN said: The Committee have come to the conclusion that the preamble of this Bill is not proved, nor is the preamble of the other Bill [The London Water Commission Bill]; and they will proceed to consider what special report they shall make to the House. With reference to the application for costs, we think that the Bill of the Vestries (as well as the other Bill) has been promoted perfectly *bonâ fide*, and with a view to advance the public interest; but we have no power to deal with the question of costs.

Mr. RICKARDS: I do not know if I might add one word upon that.

The CHAIRMAN: I do not think we can go into the question now. You may consider what can be done. I say the Committee had no authority to go into the question of costs, so far as I understand it.

Mr. RICKARDS: May I ask, Sir, that your report upon the Vestries' Bill may contain an allusion to the question of costs? I do not suggest what allusion.

The CHAIRMAN: The Committee will consider the points.

As already mentioned in the JOURNAL, the Croydon Water Bill was then withdrawn; it being stated that the Bill was contingent upon either of the other Bills being passed—being for the acquisition by the borough of that part of the Lambeth Company's undertaking which was situate within the jurisdiction of the Corporation. With reference to the Bill of Mr. Causton—the Metropolitan Water Companies' Charges Bill—no one was present to give any information respecting it; but it was stated that it would probably not be proceeded with further this session. The Committee then adjourned till the following Tuesday to consider their report; and on this day, as already stated (*ante*, p. 36) the above-mentioned Bill was disposed of—no one appearing in support of it.

The Committee met again last Tuesday, and agreed upon the terms of their report. In the interval since the previous meeting, the Chairman had made a number of alterations in his original draft, with the object of removing minor objections; nevertheless, the amended report led to considerable discussion. Mr. J. W. Lowther proposed the insertion of four new clauses—(*a*) dealing with the question of the adequacy, in point of quality and quantity, of the present supply, and the question of the sources from which an additional supply should be obtained; (*b*) recommending the appointment of a Royal Commission, composed of specially-qualified scientific members, to consider how far, if at all, the supply at present derived from the Thames and Lea, and the springs and wells in the Metropolitan water area, should be limited or extended; (*c*) expressing the opinion that the complaint against the Chelsea and West Middlesex Companies respecting their agreements for additional intakes from the Thames have not been satisfactorily answered; and (*d*) suggesting that local authorities within the Metropolitan water area having their own independent rights should, in the event of purchase, be guaranteed in the exercise of their present rights. Of these all were rejected except the last.

The Committee's Report.

The following is the text of the Committee's report as finally adopted and presented to the House:—

Your Committee have proceeded upon the assumption that, in the opinion of Parliament, it is desirable to establish a single public representative Water Authority for the Metropolis.

The Royal Commission presided over by the Duke of Richmond reported in 1869 "that the future control of the water supply should be entrusted to a responsible public body, with powers conferred on them for the purchase and extension of existing works, and for levying certain rates referred to." And the Select Committee, of which Sir W. Harcourt was Chairman, and which examined into the provisional agreements for purchase contained in the Government Bill of 1880, reported "that it is expedient that the supply of water to the Metropolis should be placed under the control of some public body, which shall represent the interest and command the confidence of the water consumers."

Since these reports, much valuable experience has been gained of the growth of population, and of the undertakings of the Water Companies and the demands upon them. Parliament also, since 1886, has adopted the policy of enforcing more stringent provisions in case of the issue of any fresh capital. An important inquiry into the whole matter, too, has recently been held by the Corporation of the City of London; and it is evident that there is much fresh light for the consideration of the question from every point of view. Your Committee therefore consider it to be most desirable that the problem should be carefully and deliberately examined by the newly-constituted Municipal Authority—the London County Council—in the interests of the water consumers of the Metropolis.

The London County Council were, in the session of 1890, entrusted with powers to initiate negotiations with the Water Companies, and to incur certain limited expenditure in preliminary inquiries; but these inquiries are necessarily as yet incomplete.

Your Committee recommend—

I.—That powers should be granted to the London County Council to expend such further sums as may be reasonably necessary, in order that they may examine thoroughly for themselves, as the responsible Municipal Authority of London, the whole position of the Metropolitan Water Supply, and come to a conclusion as to the policy which, for financial and other reasons, it is desirable to adopt.

II.—That, if they should so resolve, they should have power to promote a Bill or Bills in Parliament for the purpose of constituting themselves the responsible Water Authority for London, acting through a Statutory Committee, appointed either wholly by themselves or partly in conjunction with the Corporation of the City of London, as suggested to your Committee on behalf of both bodies. Such Statutory Committee to comprise a certain number of members possessing special knowledge and qualifications, not necessarily members of the body or bodies appointing.

III.—That the London County Council, if constituted the Water Authority, should be required to purchase, either alone or in conjunction with such of the Authorities of the outside areas as may be arranged, the undertakings of the eight Water Companies (except possibly certain lands of the New River Company) by agreement, or, failing agreement, by arbitration within a fixed period.

IV.—That, subject to any such arrangements, the new Water Authority should take over the duties and obligations which the present Water Companies now have towards the consumers of water in the districts outside the boundaries of the county of London, but within the limits of supply of the present Companies.

V.—That, in the event of purchase by the new Authority, power should be given to that Authority, and to the Authorities of the outside areas, to negotiate for the purchase by the latter (1) of so much of the works of distribution as is appropriated to the district of such Local Authority, and of the right to a supply of water in bulk from the new Authority; or (2) possibly of some of the sources of supply which, with their works of distribution, it might be found practicable and advantageous to sever from the general scheme.

VI.—That those Local Authorities which, like Croydon, Richmond, and Tottenham, are situated within the Metropolitan water area, but have their own independent water supply, should, in the event of the purchase of the Water Companies by the new Water Authority, be guaranteed in the exercise of their present rights.

In the event of the undertakings of the Companies not being acquired by purchase, the Committee recommend that there should be a parliamentary inquiry, before which the interests of the whole of the consumers within the area of the present Metropolitan Water Supply ought to be represented, into the statutory powers and obligations of the Water Companies, and the control which is now exercised by public departments and the Metropolitan and other Authorities over them. In the appendix to the minutes of evidence will be found a memorandum setting out the existing conditions; but it might possibly be found advantageous to make the obligations and the control more complete.

Your Committee found it impossible, within the limits of the time at their disposal, to conduct satisfactorily any examination into the quality and quantity of the London Water Supply. But, apart from that consideration, they are of opinion that these questions will naturally form a part of the complete inquiry which it will be the duty of the London County Council to conduct, with the assistance of the professional advice which, as your Committee have recommended, should be at their disposal.

Although your Committee have not been able, for the same reason, to examine into any of the cases sought to be established before them by the various Local Authorities of the areas in which are contained the present sources of supply, for the protection of their separate interests, your Committee have received sufficient indication that there exist complaints, founded or unfounded, that those sources are in some

quarters being even already overtaxed. Your Committee do not see their way to recommending any practicable method for the effective association of any of these Authorities with the inquiry, for which the London County Council must be responsible. But they are of opinion that, in any such inquiry, regard must be had, on the one hand, to the statutory rights of the present Water Companies, and, on the other, to the legitimate wants and necessities of the inhabitants of those areas. It must remain with Parliament ultimately to decide upon the merits of any scheme submitted.

In view of the possibility of its being ultimately established that the present sources of supply cannot be extended, and that additional sources of supply are required, and as the possible fresh areas of supply are limited, and are already being drained for other large communities, your Committee think that Parliament may well consider, before granting any powers for further encroachment upon those areas, how far provision ought fairly to be made for the possible requirements alike of the Metropolis and of the other large populations upon the lines of supply.

Of the two Bills before your Committee for the constitution of a new Water Authority [the London Water Commission Bill and the Metropolis Water Supply Bill] neither appears to them calculated to effect a satisfactory solution of the problem; but your Committee desire to place upon record their opinion that both those Bills were promoted in the public interest, and to considerable public advantage.

LEGAL INTELLIGENCE

HIGH COURT OF JUSTICE—QUEEN'S BENCH DIVISION.

Tuesday, July 14.

(*Before the* LORD CHIEF JUSTICE OF ENGLAND, *and Justices* MATHEW, CAVE, A. L. SMITH, *and* CHARLES.)

Connor v. Ritson—Gibson v. Lawson—Curran v. Treleaven. Judgment in the Trade Union Cases.

Judgment was delivered to-day in these cases, which were argued in April last before the Judges above mentioned, and in which they had taken time to consider their judgment. The last of the three was the Plymouth case, decided by the Recorder, and argued by Sir H. James and Mr. Poland.* In the first of the three, as the Recorder of Newcastle had allowed the accused to be examined, the conviction, it will be seen, was quashed on that ground, so that the main question did not arise. In the second case the Magistrates had, on the facts, dismissed the complaint against which the employer appealed, and the Court upheld their decision. In the last case, the Recorder had, on appeal, affirmed the decision of the Magistrates who had convicted, and stated a case on which the conviction was reversed.

Lord COLERIDGE read a written judgment, embracing all three cases, in these terms: In the first case, we are all of opinion that the conviction cannot be sustained, but upon a ground peculiar to this case only; and our judgment upon it can throw no light upon the general and more important questions raised in the other cases, which were argued at the same time as this. The Recorder of Newcastle-upon-Tyne, who heard the case, allowed the appellant to be examined and cross-examined; and in the case which he has stated for this Court, he has informed us that the appellant's evidence formed part of the grounds upon which he founded his judgment. This was pointed out to us very properly by Mr. Poland when he came to argue the case before us. We think it is decisive. No statute allows, and certainly the common law forbids, a prisoner to give evidence on such a charge as the one in this case; and it follows that, as the conviction was obtained partly by means of illegal evidence, it cannot be sustained, and must be quashed. It is due to the learned Recorder to state that we have been informed that he was misled by the argument of the Counsel before him, that the evidence had been made receivable by statute. So much alteration of the law in this direction has lately taken place, that the belief and acquiescence of the Recorder are not to be wondered at. In fact, however, the law has not yet been altered. The Recorder was very naturally misled; but the consequence of his mistake is necessarily that which we have stated. The next case to be considered is that of *Gibson v. Lawson*, in which the circumstances are peculiar, and in which the Magistrates having dismissed the charge, the appeal is against the dismissal of the summons—a course, no doubt open to the appellant under 42 & 43 Vict., cap. 49, sec. 33—the Summary Jurisdiction Act, 1879. This summons was under 38 & 39 Vict., cap 86, sec. 7, and charged in substance that the respondent unlawfully intimidated the appellant. The respondent was employed as a fitter in the yard of an iron shipbuilding company; the appellant was employed in the same capacity in the same yard. The respondent was a member of a Society called the Amalgamated Society; the appellant was a member of a Society called the National Society. On Dec. 3, 1890, a meeting of the Amalgamated Society was held, at which it was resolved that the members of that Society would strike unless the appellant left his Society and joined them. The respondent communicated this resolution to the foreman of the shipbuilding company, who communicated it to the appellant. Thereupon the appellant had an interview with the respondent. In the result, the respondent informed the appellant that the Amalgamated Society were determined to carry their resolution into effect; but gave him till the morning of the 6th to make up his mind. The appellant adhered to his own Society; and the shipbuilding company, in order to avoid a strike, dismissed him from their yard. It is expressly found in the case that no violence or threats of violence to person or property were used to the appellant; but he swore that he "was afraid, because of what the respondent had said, that he would lose his work and would not get employment anywhere where the Amalgamated Society predominated numerically over his own Society." These are the whole of the material facts; and on these facts the Magistrates dismissed the summons, and, we think, rightly. The summons was issued, as already stated, under 38 & 39 Vict., cap. 86, sec. 7. The third section of that Act distinctly legalizes strikes in the broadest terms, subject to the exceptions enumerated in the fourth and fifth sections which immediately follow, and are almost in the nature of provisoes upon the third. The sixth section is alien from the present question; and then comes the seventh, upon which we have to decide. It is true that the Act before us is one of a series of Acts dealing with subjects the same as, or cognate to, those dealt with in the Act itself. Many of these are expressly repealed by the 17th section, and amongst them 34 & 35 Vict., cap. 32, is wholly repealed. This Act was passed in 1871, after the charge to the jury by the present Lord Bramwell in *The Queen v. Druitt*, which was in 1867. Whether or not the Act was produced by the charge, it is profitless to inquire. The last proviso of the first section is plainly inconsistent with the charge, and still more inconsistent with the language of Mr. Justice Crompton and Mr. Justice Hill, who, in *Hilton v. Eckersley* and *Walesby v. Onley*, had the one declared and the other suggested that strikes were *per se* criminal at common law; and still further, with the somewhat rhetorical language of Sir William Erle, who describes a strike as "the power of evil, in remorseless activity, destroying those relations between employer and employed on which comfort and peace depend—bringing guilt and misery on workmen, and ruin on their employers" ("Erle on Trade Unions," p. 85). The statute of 34 & 35 Vict., cap. 32, is not, indeed, conceived in any weak spirit of tenderness to workmen; but the second subsection of the first section limits "intimidation" in that subsection to such intimidation as would justify a Magistrate in binding over the intimidator to keep the peace towards the person intimidated—in other words, to such intimidation as implies a threat of personal violence. Of such intimidation there is in this case no evidence whatever. But it is truly said that this statute is repealed, and is of importance only so far as its object and language may throw light upon the existing statute—the statute under which the summons was issued. It seems clear, however, that, looking at the course of legislation, and keeping in mind the changing temper of the times on this subject, the word "intimidate" in the seventh section of the later Act cannot reasonably be construed in a wider or severer sense than the same word in the second subsection of the first section of the earlier Act. "Intimidate" is not, as has been often said by Judges of authority, a "term of art." It is a word of common speech and every-day use; and it must receive, therefore, a reasonable and sensible construction, according to the circumstances of the cases as they arise from time to time. We do not propose to attempt an exhaustive definition of the word, nor a complete enumeration of the cases to which it may be properly or improperly applied. It is enough for us to say that in this case it appears to us all that there was nothing which, under any reasonable construction of the word "intimidate," could be brought within it. Whether the action of the Amalgamated Society was morally right or not, is a matter on which we express no opinion, because it is not the question before us. It seems to us that it was not illegal within the words of the Act of Parliament under which the summons was issued. This, however, does not entirely dispose of the question; for we were very properly reminded of the cases of *The Queen v. Druitt*, and *The Queen v. Bunn*, in which Lord Bramwell and Lord Esher are both said to have held that the statutes on the subject have in no way interfered with or altered the common law, and that strikes and combinations expressly legalized by statute may yet be treated as indictable conspiracies at common law, and may be punished by imprisonment with hard labour. Neither of those cases is very satisfactorily reported; in neither was there any motive for questioning the *dicta* of the Judges. In the one tried by Lord Esher (then Mr. Justice Brett), there was no opportunity, in consequence of the prisoner having been acquitted on all the counts to which the alleged ruling applied; and in the other case, the prisoner was merely put under recognizances to appear if called upon to receive sentence, and so had no motive to question the judgment. We are well aware of the great authority of the Judges by whom the above cases were decided. But we are unable to concur in these *dicta*; and, speaking with all deference, we think they are not law. It seems to us that to hold that the very same acts which are expressly legalized by statute remain nevertheless crimes punishable by the common law, is contrary to good sense and elementary principle, and that the reports, therefore, cannot be correct. If the *dicta* are law, they render the statutes inoperative; and the statutes might as well not have been passed. The *dicta* are criticized in detail, and with great ability, in Mr. Justice Wright's excellent work on the law of criminal conspiracies, p. 50-59. It is difficult to withhold assent from the statements and reasonings contained in those pages; and it seems to us that the law concerning combinations in reference to trade disputes is contained in 38 & 39 Vict., cap. 86, and in the statutes referred to in it, and that acts which are not indictable under that statute are not, if, indeed, they ever were, indictable at common law. There remains to be considered the case of *Curran v. Treleaven* in which the Recorder of Plymouth affirmed a conviction by Magistrates, who had convicted the Secretaries of three Trade Unions in Plymouth for having intimidated Treleaven, a shipowner in that town, within the meaning of 38 & 39 Vict., cap. 86, sec. 7, subsec. 1. The circumstances were very much like those in the last case which we have just decided. In order to prevent the employment by Mr. Treleaven of non-Union men, the three Secretaries told him that if he did not cease to employ non-Union men they would call off from their employment by him all the members of their respective Unions. Mr. Treleaven refused compliance with their demands. Thereupon the Secretaries called off their respective Union men, who, in obedience to the call, struck work. The facts are stated to us as follows by the learned Recorder in the case which he has submitted to us. [His Lordship read passages therefrom to the effect he had stated.] The learned Recorder also states: "The defendants did not desire or intend that any violence should be used, or that any injury should be done to Mr. Treleaven or his property; and it was not proved that their words or acts were calculated directly to cause any such violence or injury, though I am of opinion that Mr. Treleaven was not unreasonably afraid that such violence or injury may have occurred from the action of the members of the Trade Unions, and the consequent strike, against the wishes and intentions of the defendants. The defendants had no ill-will against Mr. Treleaven

* See JOURNAL, Vol. LVII., pp. 114, 844.

personally, but acted with the object of obliging all members of the Union to abandon their work." The Recorder held, as the result of a very careful and able examination of the statutes and authorities, that the facts of the case did constitute intimidation within the words of the section, and that the men were properly convicted. We are unable to agree with him. As we have said, we do not propose to enter into an exhaustive enumeration of all the possible acts which do or do not constitute intimidation within the enactment. But we say that to tell an employer that, if he employs workmen of a certain sort, the workmen of another sort in his employ will be told to leave him, and to tell the men, when the employer will not give way, to leave their work, "using no violence, but quietly ceasing to work"—we quote the language of the Recorder—is certainly not intimidation within any reasonable construction of the statute. Two further observations are necessary in order to make our judgment complete and effective. We do not think that the Legislature intended, by the change of words in the first subsection of the seventh section of 38 & 39 Vict., cap. 86, to send the Courts back to 6 Geo. IV., cap. 129, for an interpretation of the word "intimidate," though the latter statute did repeal 34 & 35 Vict., cap. 32, which limited intimidation to cases which would justify a Magistrate in binding over the party to keep the peace. There is indeed much to be said for the view entertained by my brother Cave, and acted upon by him (as mentioned by the Recorder in his judgment) in a case tried before him at Liverpool—viz., that intimidation in 38 & 39 Vict., cap. 86, must still be limited to threats of personal violence, as enacted by 34 & 35 Vict., cap. 32. It may become necessary to decide this point in time to come—it is not now; and we confine ourselves to the negative statement that 6 Geo. IV., cap. 129, is not now on this subject the governing statute. The other point is this: The Recorder held that, though an agreement to strike to benefit themselves would be now a lawful agreement, a strike which would have the effect of injuring an employer is illegal and indictable at common law. He cites in support of his view some phrases from the judgments of the Lords Justices in the case of the Mogul Steamship Company. But, with deference, he has somewhat misapprehended the point of those observations. It is true that when the object is injury, if the injury be effected, an action will lie for the malicious conspiracy which has effected it; and therefore it may be that, such a conspiracy, if it could be proved in fact, would be indictable. But it was pointed out in some detail by the Court of First Instance that where the object is to benefit oneself, it can seldom, perhaps never, be effected without some consequent loss or injury to someone else. In trade, in commerce, even in a profession, what is one man's gain is another's loss; and where the object is not malicious, the mere fact that the effect is injurious does not make the agreement either illegal or actionable, and therefore such an agreement is not indictable. The Recorder finds that there was no malice in fact; and this finding is inconsistent with the conclusion that the agreement was either criminal or unlawful. For these reasons, we are of opinion that the judgment of the Recorder cannot be sustained, but must be reversed, and the conviction quashed.

Eccles Local Board and the Salford Gas Supply.—The Local Boards of Eccles, Swinton, and Pendlebury are already taking steps to secure the advantages of the clause inserted in the Salford Corporation Order, as reported in the JOURNAL last week (p. 71). The Joint Committee of the three Boards yesterday week reported to the Eccles Board the result of their opposition; and afterwards a resolution was passed re-appointing the Committee, and authorizing them to take all proceedings necessary to promote a Bill in the next session of Parliament, to give them powers to manufacture their own gas.

Gas Supply in the Colonies.—In the report of the Directors of the Charters Towers (Queensland) Gas Company for the half year ending April 30 last, they stated that the consumption of gas for this period had been 3,160,900 cubic feet, as compared with 3,026,900 cubic feet for the corresponding period of 1890. The working resulted in a balance of £1225. The price of gas at Deniliquin (Victoria) used to be 20s. per 1000 cubic feet. It has now been reduced to 16s. The inhabitants do not seem to mind paying for light. The Borough Council of Albury (N.S.W.) a short time ago made a proposal to purchase the local gas-works; but the scheme was regarded with much disfavour by a section of the ratepayers, who memorialized against it.

The Southwark and Vauxhall Water Company and the Water Supply of Richmond.—The Water Committee of the Richmond Town Council have recently been endeavouring to induce the Southwark and Vauxhall Water Company to reduce the charge for water supplied in bulk to the Council from 1s. per 1000 gallons to 6d., as charged in other districts, and they asked the Company to quote a price for the supply, if the Council were prepared to enter into a definite agreement, for a period of one or three years, of 50,000, 75,000, and 100,000 gallons per day. They have received a reply, stating that the Directors feel that due regard must be paid to the statutory obligations imposed on the Company by Parliament, and that it may not be possible for them to enter into such an agreement. The Council have authorized the Water Committee to proceed to arbitration for a reduction in the charge, if they are unable to obtain a satisfactory reduction by negotiation.

Issue of Further Stock in the Bristol Water-Works Company.—An extraordinary meeting of the Bristol Water-Works Company was held last Tuesday, for the purpose of authorizing the issue of further stock. The Chairman (Mr. E. Bush) explained that in August last the shareholders sanctioned the disposal of the Company's stock by tender. It was now thought desirable that the remainder of that unissued stock should be sold by public auction, in such amounts and at such times as the Directors thought fit. He therefore begged to move that the balance remaining of the £240,000 capital created under the powers of the Act, notwithstanding the resolution of August, be tendered for sale by public auction. Mr. Abbott seconded the motion, remarking that the lots would be put up as low as £50, so that small capitalists might have the opportunity of obtaining a higher rate of return than that afforded by the Post-Office Savings Bank. It was intended to offer £10,000 worth by auction in £50 lots; the purchasers to complete payment in three months. The motion was carried.

MISCELLANEOUS NEWS.

METROPOLIS GAS SUPPLY.

The Quality of the Gas in the Past Quarter.

The following is an abstract of the report of the Chief Gas Examiner (Dr. A. W. Williamson, F.R.S.) as to the quality of the gas supplied by The Gaslight and Coke, the Commercial, and the South Metropolitan Companies, during the quarter ending the 30th ult.:—

I. *With respect to Illuminating Power.*—The maximum, minimum, and average illuminating power, in standard sperm candles, at each of the testing-stations, was as follows:—

	Max.	Min.	Aver.
The Gaslight and Coke Company—			
Jewry Street, E.C.	—	—	—
Cloth Fair, E.C.	18·2	15·9	16·9
Dorset Buildings, E.C.	17·6	15·2	16·8
Ladbroke Grove, W.	17·2	16·1	16·5
Devon's Road, E.	17·1	16·3	16·5
Carlyle Square, Chelsea, S.W.	16·7	16·0	16·2
Camden Street, N.W.	16·9	16·0	16·5
George Street, N.W.	17·2	16·0	16·3
Graham Road, E.	18·1	16·2	17·0
Kingsland Road, E.	17·4	16·1	16·6
Spring Gardens, S.W.	17·7	16·0	16·6
Grove Gardens, Regent's Park, N.W.	17·3	16·0	16·3
Hornsey Road, N.	18·3	16·4	17·0
Lambeth Road, S.E.	16·6	16·0	16·2
Millbank Street, S.W. (cannel gas)	24·3	20·5	21·6
Commercial Gas Company—			
Parnell Road, E.	18·1	16·0	16·6
Wellclose Square, E.	17·5	15·6	16·3
South Metropolitan Gas Company—			
Hill Street, S.E.	17·1	16·0	16·4
Foster Place, S.W.	16·8	16·3	16·5
Stoney Lane, S.E.	17·9	15·4	16·6
Lewisham Road, S.E.	17·0	15·3	16·0
Burrage Road, S.E.	17·7	13·6	16·4
Blackfriars Road, S.E.	17·3	15·1	16·5

It will be seen from these results that the average illuminating power of the gas at all the testing-stations has been higher than the parliamentary standard, especially at the Milbank Street, Graham Road, and Hornsey Road stations of The Gaslight and Coke Company. At the Carlyle Square, Camden Street, Spring Gardens, Grove Gardens, Lambeth Road, and George Street stations of this Company, the minimum illuminating power was equal to the requirements. This was also the case at the Parnell Road station of the Commercial Gas Company; and the Hill Street station of the South Metropolitan Gas Company. Deficiencies in the lighting power of the gas were reported during the quarter at the following stations by the Official Gas Examiners: Gaslight and Coke Company—King Street and Dorset Buildings, E.C. Commercial Gas Company—Wellclose Square, E. South Metropolitan Gas Company—Stoney Lane, Blackfriars Road, Lewisham Road, and Burrage Road, S.E.

II. *As regards Purity.*—Sulphuretted hydrogen was not present in the gas at any of the testing-stations. The proportions of sulphur in other forms averaged less than the amount allowed (17 grains) at all the stations; and, with the exception of a slight excess at the George Street station of The Gaslight and Coke Company (17·9 grains), the maximum amount present in the gas at each of the stations was less than the limit fixed by Act of Parliament. Ammonia was generally present in the gas at all the stations throughout the quarter; but only in slight quantities. The amount allowed was not exceeded on any occasion.

THE PROCEEDINGS OF THE BOARD OF TRADE UNDER THE ELECTRIC LIGHTING ACTS.

The Board of Trade have issued a report respecting the applications made to them under the Electric Lighting Acts, and their proceedings thereon, during the year ending the 30th of June last.

There were in all 70 applications—37 by local authorities, and 33 by companies or private individuals—12 of them relating to London. The Orders applied for by companies have, with one exception, been granted with the consent of the local authorities of the districts affected. In three instances applications were received from the local authority and also from a company for the same area. In two cases the local authority withdrew their application; and accordingly the Board of Trade granted Orders to the companies. In the third, an inquiry was held, after which the local authority withdrew their application. The company, however, objected to a provision proposed to be inserted in the Order by the Board of Trade, and did not proceed with their application. The Orders follow, to a great extent, the form of those granted last session; but a clause has been inserted forbidding the placing of electric lines above ground without the express consent of the Board of Trade. At the request of the Corporation of Edinburgh, the Board of Trade inserted a provision in the Bill to confirm the Edinburgh Electric Lighting Order, authorizing the Corporation, with the consent of the Secretary for Scotland, to borrow money for electric lighting purposes, and to keep the accounts of the undertaking authorized by the Order under the provisions of the Edinburgh Municipal and Police Acts, which regulate the other borrowing powers and accounts of the Corporation, instead of under the Electric Lighting Acts. They also inserted in the Bill to confirm the Woolwich Electric Lighting Order a clause providing that the Woolwich Local Board of Health shall be the local authority for electric lighting purposes for the parish of Woolwich, in order to remove a doubt that existed as to the effect of the Electric Lighting Act, 1882. Bills to confirm the Orders granted were in due course introduced into the House of Commons; and they have in most cases passed through their various stages. Their progress has been recorded

in our "Parliamentary Intelligence." No applications for Licences were received by the Board during the year.

Appended to the report is a list of the Provisional Orders confirmed by Parliament prior to the present session, and of the Licences granted by the Board of Trade, since the passing of the Electric Lighting Act, 1882; showing those which have since been revoked or repealed.

MANCHESTER CORPORATION GAS SUPPLY.

Annual Report of the Committee—The Price of Gas.

At an Adjourned Meeting of the Manchester City Council last Wednesday—the MAYOR (Mr. Alderman Mark) presiding—the annual report of the Gas Committee and the statement of accounts were submitted. An abstract of the report appeared in the JOURNAL for the 30th ult., and the principal portions of the accounts were given in the following week's issue.

Mr. GIBSON, in moving the adoption of the report, mentioned that the Committee were hurrying on the work of improving their plant, in order that a greater quantity of gas could be manufactured. On behalf of the Committee, he was empowered to say that the moment this work was accomplished, the price of the gas would be reduced to the utmost possible limit.

Alderman HINCHLIFFE seconded the motion.

Mr. WORTHINGTON said he rose to move an amendment; and he did so in the belief that the ratepayers demanded a large reduction in the price of gas. Their demand he regarded as a reasonable one—first, because by promoting the increased use of gas for general lighting, heating, and manufacturing purposes, the smoke nuisance, which was so detrimental to the health and comfort of the ratepayers, would be abated; secondly, because the reduction in price would help to do away with what was at present, in fact, a tax on light and heat; thirdly, because it would relieve the gas consumers from what appeared to most persons to be the gross injustice of obliging them to pay towards the city improvements, to which they had already contributed upwards of a million pounds in the last thirty years. If there was any Corporation in the kingdom which should be able to supply gas at the very lowest rate, it was that of Manchester, as they had access to the best and cheapest supplies of fuel; they had a demand at their door for all their residual products, which during the past year produced £97,455; and they had works which, although valued by Mr. Alderman King at £2,250,000, showed by this year's accounts total liabilities of only £772,526. He had gone into the figures of the accounts, and found that they exhibited a total profit of £84,771, which was equal to 6·37d. per 1000 cubic feet of reduction that might be made, or (say) 6d. if a liberal allowance were made for interest and sinking fund on the £91,000 which was being expended in the extension of the works. Taking into consideration all the circumstances of the case, he had every confidence in urging the Gas Committee and the Council to adopt the very moderate proposal of an immediate reduction of at least 3d. per 1000 cubic feet, leaving plenty of margin for all contingencies, and making the further reduction to 6d. when the extended works were completed after Christmas. He made this suggestion inasmuch as he understood there were some financial difficulties in the way of an immediate reduction of 6d. He was convinced now—and he urged this upon the Council two years ago—that the sale of gas at cost price would be a great benefit to the citizens, and that it would be more just to the gas consumers than the present system was. He begged to move as an amendment that the Gas Committee be asked to reconsider the last paragraph in their report with a view to reducing the price of gas to the extent of not less than 3d. per 1000 cubic feet.

Alderman RUSSELL, in seconding the amendment, remarked that the question was one of great urgency, for the reason that it bore so intimately on the public health of the city.

The MAYOR said the Town Clerk reminded him that the estimates of the Gas Committee for the current year having been already passed by the Council, it would not be competent for the Council to instruct the Gas Committee to reduce the price of gas during this year. The subject was one of such vital importance to the public that he was sorry to have to rule the amendment out of order.

Mr. LLOYD referred to the yield of ammoniacal liquor per ton of coal carbonized, and asked why the quantity was so small in Manchester in comparison with other towns.

Mr. RHODES criticized some of the other figures in the accounts; pointing out that in respect of the quantity of gas per ton of coal carbonized, and in other ways, the figures were much less satisfactory than they had been in any year since 1881. He reminded the Council that, during the fog of last winter, Manchester was within a short distance of being in total darkness. This was a thing such as the Gas Committee ought to have anticipated, as its occurrence would have been little short of a calamity. The Committee did not appear to have been keeping up the capacity of the works in proportion to the consumption.

Dr. SIMPSON said he was sorry there should be any technical difficulty in the way of reducing the price of gas.

The MAYOR said the point was that it could not be done in the form of an amendment to the report of the Gas Committee; but the Committee could of their goodwill recommend a reduction in price if they thought necessary.

Dr. SIMPSON said that in that case he would trust to the goodwill of the Gas Committee to do what they could.

Alderman KING said that at the time of the stokers' strike a great deal of harm was done to the retorts. This accounted for the falling off in the residuals to which Mr. Lloyd had referred; and it was also an answer to some of the other criticisms which had been passed on the report and accounts.

Alderman HINCHLIFFE said that one important circumstance to be borne in mind in considering the question of the price of gas was that the cost of production was one-third more than it had been previously. The Gas Committee were entitled to credit for what they had done with regard to the electric light, as to which they were taking very active steps. He did not think the Committee should move too fast either in extending the works or in diminishing the price. They should see, for one thing, what effect the electric light would have on the consumption of gas.

Mr. LEECH thought it was undesirable to flog the willing horse; and he believed the Gas Committee were willing to extend the supply of gas and lower the price as much as possible.

Mr. MURRAY, while expressing sympathy with the mover and seconder of the amendment, counselled them to wait for (say) another year. With regard to what one of the speakers had said about depreciation and sinking fund, there had been such a writing down in the past that he thought the Gas Committee might well write up the works again, and so bring about an adjustment to some extent. There could be no doubt that for the last thirty years the accounts had been on an entirely wrong basis. (Alderman KING: Nothing of the kind.) The Oldham case seemed to show that this was so. It had been laid down that a corporation was not entitled to take any profit—that a corporation could simply take interest on money and sinking fund and a little beyond, but no profit in reduction of the rates. He thought that no reduction in price need be made now, but that there ought to be a reduction of 6d. in March, 1892.

Alderman SHAW remarked that, as a citizen, he protested against running all the risks in connection with the ownership of the gas-works and not deriving any profit. During the past twenty years much had been heard about the electric light and other rivals of gas; and he thought they were perfectly justified in writing off as they had done, so as to be prepared for any emergency. If there had been any mistake in the past, it had been on the right side.

Mr. RICHARDS expressed his disapproval of the cry for gas at cost price. He reminded the Council of the many improvements carried out in the city by the aid of the profits from the gas-works.

Mr. GIBSON, replying on the discussion, said the extensions now in progress would give an increased production of about 5½ million cubic feet per day. They would be able to make one million cubic feet per day more than they did during last winter; but this extra million would be absorbed by the out-townships. Consequently, they could not reduce the price yet, as they could not meet the increased consumption to which the reduction in price would give rise. For the reasons which had been advanced by Alderman Shaw, he endorsed the policy of the Gas Committee with which Mr. Murray found fault, although from what he had recently seen and heard, he believed that the electric light was so costly that it would be many years before it would become a powerful rival of gas. In reply to a question by Mr. Abbott, as to whether they had taken any outside expert's opinion as to the methods of working in use at the gas-works or as to the extensions now in progress, Mr. Gibson said the Gas Committee had obtained no outside opinion, and did not want any.

The motion was then carried.

THE SUPPLY OF GAS FOR LIGHTING PURPOSES AND FOR GAS-ENGINES.

Important Decision in the Glasgow Sheriff Court.

Some months ago an action was raised by Mr. John Crawford, printer and lithographer, of 66, Mitchell Street, Glasgow, against the Corporation Gas Commissioners of that city, concluding for the sum of £7 12s. 8d., the amount of damages said to have been sustained by him in consequence of the alleged defective supply of gas to his premises during one of the foggy days in November last. On the occasion in question, the supply of gas suddenly ceased; and, as a consequence, work had to be almost entirely suspended, and a considerable number of workmen kept unemployed. The case was first raised in the Small Debt Court; but, owing to the novelty and importance of the points involved, it was, at the instance of the defenders, transferred to the Ordinary Court. In the defences of the Commissioners, certain preliminary pleas were raised as to the relevancy and competency of the action. A somewhat protracted debate took place before Sheriff Erskine Murray on these pleas on the 17th of March last, and again on the 23rd ult. He has now issued an interlocutor, giving effect to the pleas of the Commissioners, and finding them entitled to expenses. In an accompanying note, the Sheriff stated as follows:—

By the Act of 1869, the Corporation of Glasgow took over the undertakings of the two former Gas Companies in Glasgow. By that Act, section 64, they are bound to furnish (the word used is "shall"), to the owner or occupier of a building within 50 feet of the Corporation mains, gas for illuminating purposes on certain conditions. By section 55 the illuminating power is to be equal to 25 sperm candles (which by the Act of 1882 is reduced to 20). There is no provision as to the degree of pressure of the gas in the mains. The 1869 Act, section 57, has a provision for testing the illuminating power at the works, at the instance of any five consumers; and a penalty not exceeding £20, in case the illuminating power is found deficient, is to be paid to the complainers. The Gas-Works Clauses Act, 1847, is not expressly incorporated in the Corporation's Acts; but for various reasons, unnecessary to go into, it seems correct to hold that its provisions may be taken as generally applicable to the Corporation's gas undertaking, in so far as not varied by, or inconsistent with, the provisions of the Special Acts. Now, the Act of 1871 provides (*inter alia*) in section 11 that gas undertakers shall "give and continue to give a supply of gas under such pressure in the main as may be prescribed," on certain conditions—the gas to be of a certain illuminating power (not that fixed in the Special Act of 1869) and of certain purity; but the 1871 Act itself prescribes no standard of pressure. Further, the 1871 Act provides that, where the undertakers neglect or refuse to give a supply of gas under such pressure as is prescribed, they shall be liable to a penalty of 40s. a day for each day of default; and if it is proved to the satisfaction of two Justices that on any day the gas is under less pressure, of less illuminating power, or of less purity than it ought to be under the provisions of this Act (of 1871) or the Special Act, the undertakers forfeit to the parties applying for testing a sum not exceeding £20. The first of these provisions evidently refers to the

original refusal or neglect to give a supply at all; the second, to default in the course of supply. But as neither the 1871 Act nor the Special Act of 1869 says anything about the amount of pressure, there is no provision for a penalty in case of the pressure being less than a consumer contends that it ought to be. Under the 1871 Act, the testing apparatus only applies to the illuminating power and purity, and under the 1869 Act, only to illuminating power; and while the 1869 Act only provides for a penalty in case of the illuminating power being insufficient, the 1871 Act, in addition, supplies a penalty in case of impurity. Now, when a penalty is clearly provided for a breach of undertaker's engagements, complainers can only sue for the penalty, and not for damages. (See Atkinson—L. R., 2 Ex. Div., 448.) Are, then, the undertakers, where a Special Act is silent as to pressure, or any penalty for want of it, not bound to provide any pressure at all? It seems that this would nullify the other provisions of the Acts, and that, therefore, if they are bound to give a supply of gas, they are also bound to give it at a reasonable pressure. But as nobody is bound to take and use gas—in this case differing from compulsory water supply—the Corporation are clearly only bound to maintain a pressure which may fairly be taken to be sufficient for ordinary circumstances. They are not bound to provide for all exceptional and unusual circumstances, and to keep up the same pressure whatever be the state of the weather, or the sudden demands that are made upon them for lighting purposes. All the above remarks, however, refer only to the use of gas for illuminating purposes. But in 1882 the Corporation got powers, by the Act of that year, to manufacture and supply gas for non-illuminating purposes. But, as distinguished from the Acts as to illuminating power, there is no "shall," but only "may." Everything is permissive. The Corporation are not bound to supply to all and sundry; and no one can call on them to supply him. The matter is purely voluntary. To such a case, if to anyone, the rules laid down in the case of *Hazlewood v. The Hoddesdon Gaslight and Coke Company*.* apply. There it was held that, where there was no special contract or obligation under Acts, but a gas company had been supplying a customer for months, and he had hired a meter for the year, they were entitled, a dispute arising, to stop the supply of gas even without notice, just as a butcher or grocer might stop supplying his customers. Manifestly, therefore, the Corporation can stop a supply of gas for non-illuminating purposes even without notice, without subjecting themselves either in damages or a penalty. The conclusions, therefore, to which a review of the subject leads are: (1) A consumer has no right to sue at all in respect of a stoppage of a supply of gas for non-illuminating purposes. (2) In respect of gas for illuminating purposes, a consumer cannot sue for damages if the gas is of too few candle power, as for this a special penalty is imposed, which alone he can sue for. But in respect of a want of reasonably sufficient pressure of gas for illuminating purposes, it seems that he may sue for damages, as in that case there is no remedy provided, while, though there is no pressure specified as essential, a reasonable pressure is implied. On the other hand, the obligations on the undertakers being one-sided, they are only bound to supply pressure to a reasonable extent, and any doubt must be given in their favour. In the present case, the pursuer got a supply of gas for both illuminating and non-illuminating purposes. He says that on the 27th of November "the supply ceased suddenly and without warning, owing to which pursuer had almost entirely to suspend his work and a considerable number of his workmen, thereby sustaining loss and damage to the extent of £7 12s. 8d." He does not say whether this was for the want of gas for illuminating or for non-illuminating purposes. It may, for ought that he says, have been entirely the latter. Indeed, his words "almost entirely" seem to infer that he might have had a sufficient supply for illuminating purposes, had he not continued to use some for non-illuminating purposes. Now, whatever claim he possibly may have under the first head, he can have none under the second. Yet he mixes his claims up so that it is impossible to disentangle them. The matter therefore stands thus: As regards gas for illuminating purposes, the complainer is not excluded from sueing for damages for want of a reasonable pressure, as there is no penalty applicable to such a case for which he might have sued instead. As regards gas for motive power, he has no right to sue at all. He has so mixed up the two claims that it is impossible to hold his case relevant to go to proof. As a matter of fact, the Corporation aver that any deficiency of pressure on the day mentioned arose from a cause over which they had no control; being as explained, a sudden, heavy, and unexpected fog, occasioning an inordinate and unusual demand for light. This, if proved, would have been a satisfactory defence, even had the pursuer's case for damages for want of illuminating power been relevantly stated. But, for the above reasons, the question cannot be gone into in the present proceedings.

The Electric Lighting Question at Kingswood.—The Kingswood Local Board had before them last Wednesday the report of the Committee who recently visited Chelmsford to inspect the electric lighting installation there, as laid down by Messrs. Christie. After this had been read, the Chairman (Mr. W. D. Strange) explained that to light five miles of road in Kingswood would require 176 gas-lamps, placed 50 yards apart, giving 15-candle power each, which at £3 18s. 8d. per lamp would cost £648 5s. 4d. In addition to this, there would be £575 for fixing 176 lamps at £3 5s. each. The total illuminating power thus given would be 2640 candles. Under Messrs. Christie's contract, the cost for electric lighting would be £621 10s. This was cheaper than gas, and would give 5046-candle power, as against 2640 candles, besides which there would be no expense for fixing the lamps. Messrs. Parfitt's tender was for £550; and they proposed to erect six more lamps, with a total of 7000 indicated candle power. As a matter of fact, there was very little difference between the candle power of the two tenders, as Messrs. Parfitt anticipated a greater depreciation in the yield of the lamps. As a preliminary step, it was unanimously resolved to light the district by electricity; and to accept Messrs. Parfitt's tender of £550.

* See JOURNAL, Vol. VIII., p. 261.

THE GAS-POISONING FATALITY AT TROWBRIDGE.

The Inquest—Recommendations of the Jury.

As briefly recorded in last Tuesday's JOURNAL, an inquiry was held at Trowbridge on the previous Saturday, by the Coroner (Mr. F. T. Sylvester), into the circumstances attending the deaths of Charlotte Wakeley, a confectioner, her grand-daughter, Elizabeth Knowles, and a servant in her employ, named Gertrude Jones, all three of whom were discovered dead in bed on Friday, having been suffocated by gas.

The following evidence was called:—

Mr. *R. T. Richardson*, surgeon, deposed to being called about 2.30 the previous afternoon, and to finding all three persons dead. There was a strong smell of gas in the house. Frederick Cox, a lad who was in the house, had regained consciousness, and would in all probability recover. The deaths of the others were due to poisoning from the inhalation of coal gas.

Elizabeth Spittle stated that she took supper with the deceased persons on Thursday night. The smell of gas was then something "barbarous;" and Mrs. Wakeley told her she had sent to the gas-works about it. She was of opinion the gas came from outside, through a pipe being broken by the steam-roller.

John Ashe, a carman, said he called at Mrs. Wakeley's house on Friday morning at eight o'clock, to deliver some goods. The shop was then closed; and he thought they were not up. He called again at twenty minutes to two. The house was in the same condition; and looking in the keyholes, he found both keys inside. He presumed there was something wrong, procured a ladder, and a young man named Frank Cox went up. Witness told him to break the window, as he said there was a boy inside ill or dead; and he himself burst the door open. They entered the boy's room first; he was insensible, and frothing at the mouth. Cox picked him up and removed him immediately. The smell of gas was simply overpowering. He went into the room where Mrs. Wakeley and her granddaughter were; and they were both dead. He did not go into the servant's room, because he was informed she was quite dead. He heard the neighbours say they had been troubled with the smell of gas the night before; and that two boys had been sent to the gas-works about it. Neither of the windows was open, but the stair door was.

Frank Cox corroborated the evidence of the last witness.

Mr. *W. H. Stanley*, Surveyor to the Local Board, produced a rough plan of the street in which the house was situated. He said he was not aware there was an old drain there. The gas-pipes did not come under his superintendence; and he did not know that in this locality the pipes had been laid a long time. He had examined a portion of the premises. He found a cracked gas-pipe which passed through the drain of which he had no knowledge. No sewage passed through this drain, which was close to the foundation of the house. He had it opened up, and found it was cut off close to the closet of the house; but the space between it and the cupboard was simply honey-combed with rat holes. He thought, therefore, the gas passed through the cupboard, and ascended to the bed-rooms above. The gas came from a fracture in a 2-inch main, caused by the steam-roller. The average depth of the pipe was 8 or 9 inches. Similar breakages had occurred in many places in the town owing to the steam-roller, but had been discovered. Such things only happened the first time the roads were rolled.

By the FOREMAN: If the drain had been filled with concrete, and the gas-pipe laid across, it would probably not have been broken.

By Mr. C. J. JONES (who appeared for Mr. Noah Wakeley): In his opinion new gas-mains should not be laid at a less depth than 2 feet, where practicable.

By a JURYMAN: The men in charge of the roller reported the leakage, and when he (witness) arrived, repairs were being carried out. It was his duty to report such things; but the men in charge of the steam-roller were very prompt in looking to these matters. It was a very indiscreet thing to run a gas-pipe through the sewer; but he expected the latter was being used at the time. They did not pass through the drain now; the sewers were much too deep. All the mischief arose through the old drain that they knew nothing about. He considered, where practicable, the pipes should be laid lower; if not, they should be surrounded with concrete. The steam-roller had done good service in finding out the old worn-out pipes.

Sarah Morris stated that on Thursday evening she heard complaints from children about the smell of gas near the house.

George Dowling deposed that he saw the shop closed on Friday, but had no suspicion anything was wrong, and did not raise any alarm. When the window was broken by Cox, and the door by Ashe, he went upstairs, and found things as described by previous witnesses.

Frederick Randall, a lad of eleven years of age, said that Miss Rose, who lives near deceased, shortly after six on Thursday evening told him to go to the gas-works, and say there was an escape of gas. He went and saw Mr. Vince, told him about it, and he replied, "All right;" but did not say whether he would send up or not. Miss Rose simply told him to say there was an escape of gas, and he did not ask Mr. Vince to send or to go up.

Albert Davis, who accompanied last witness, gave similar evidence.

Mr. *H. Sainsbury*, Manager of the Trowbridge works of the British Gaslight Company, said that on Thursday evening he saw a slip of paper on his desk on which was written, "Smell of gas in the road outside Miss Rose's shop." This was put there by Mr. Vince. The men had all left. He had had several escapes of gas during the week in the Halve; and as it was getting late, he arranged with the men to go there early the next morning. Four of his men lived in the neighbourhood; and he thought if it had been anything serious, they would have informed him of it. He heard nothing of the gas being in the houses. If he had, he should have gone and seen to it immediately. The next morning the pipe (which was a 2-inch one) was repaired. The gas coming out into the open-air was a safeguard and could not possibly do any damage. The mains in this locality were laid before he came to the town. It was then usual to go through drains. Their mains had never been fractured before; only service-pipes. It was usual to allow pipes to remain until they received complaints, or else found defects. During the winter they might have had a dozen pipes injured by

the steam-roller. He agreed with Mr. Stanley as to the way the gas passed into the house.

By Mr. JONES: The breakage in the main was simply a small crack all the way round. The action of sewer gas on iron would produce corrosion, and there was a minimum amount of danger in gas-pipes passing through sewers; but one could not avoid that. It was possible the pipe might have been protected in some way. He had filled the old drain up, so that it was now solid. Before this occurrence, witness was not aware the pipe passed through the drain. Both pipe and drain belonged to a past order of things. Asked whether it was not his duty to take prompt action when notice was given of an escape of gas, witness said he thought they did that by commencing work next morning. His own men who knew about it lived near; and if it had been anything serious, he should have expected them to report it to him, as they very often had done.

Mr. *Frank Vince*, clerk at the gas-works, said he remembered a boy coming to him Thursday evening about 6.15; and stating that there was a smell of gas outside Miss Rose's shop in the Halve. Witness made a memorandum of it, and put it on the Manager's desk. The men employed at the works left at six o'clock. He did not take it to be a serious leakage; but one of the series that had followed the progress of the steam-roller. He took no steps to ascertain whether it was a serious or a slight matter; but merely noted the lad's message. If a serious leak was reported, they would attend to it at once; but they would not look so much to the loss to the Company, as to the safety of the public.

Henry Hillman, a stoker at the gas-works, said he heard of the escape of gas about 8 o'clock on Thursday evening. He endeavoured to trace where it came from, and found it was in the road. He lit it with a match, the result being a flame about 9 inches from the ground. He put some sand on the place as a mark to know the spot, and reported the matter to George Belcher, a gas-fitter.

Fanny Rose deposed to being inconvenienced by the smell of gas on Thursday evening, and to sending two boys to the gas-works with a message.

George Belcher stated that his attention was called to the escape on Thursday evening; but he did not consider it sufficient to do any harm, as it was only in the street. He did not think it necessary to do anything, or to report the matter to Mr. Sainsbury. It must have been the steam-roller that broke the pipe. He regarded himself as a more responsible person than Hillman. He did not hear that there was a smell of gas in any of the houses till after he was in bed; and then Mrs. Wakeley complained, and his wife told her, if she was afraid to sleep in the house, she would find her and the others accommodation. The smell was then really not in the house but in the closet. He did not make the slightest inquiry into the matter, nor take any steps to remedy it. He was not aware the closet had any connection with the house. If he had been, he would have got up.

The CORONER then addressed the jury, remarking that he believed death in all three cases was painless; and he did not think they would have any doubt as to the cause. They had heard the excuses of the different witnesses; and they would have to judge whether they considered it necessary to censure any of them. He did not think they could in the least hold that they had made themselves criminally responsible. But if they found that there had been any degree of culpability, and appended this finding to their verdict, it might prove to be extremely useful to the public in preventing such lamentable accidents as these in future.

The jury having consulted together returned the following unanimous verdict: "The jury find that Charlotte Wakeley, Elizabeth Knowles, and Gertrude Jones met their deaths by coal gas poisoning, caused by gas escaping from a fractured main pipe through the pressure of the steam-roller, the gas gaining entrance to the rooms of the victims by an unknown and disused sewer. The jury regret that Messrs. Sainsbury and Vince, on receiving notice of the escape of the gas, did not take steps to ascertain the nature of it that night; also that George Belcher, an employee of the Gas Company, deserves censure for negligence in not reporting to his Manager immediately the serious nature of the leakage. The jury recommend that sectional stop-valves should be used by the Gas Company throughout their system; and that the pipes be laid at a greater depth, or more efficiently protected. The jury consider that Cox and Ashe deserve commendation for their brave and prompt services in saving the life of the lad, Frank Cox."

The Surveyor to the Trowbridge Local Board made a report upon the disaster at a meeting of that body yesterday week. He stated that the steam-roller was at work finishing off the roadway in Union Street, where Mrs. Wakeley lived, on Thursday, the 9th inst. At the point where the gas-main was fractured, it was only 7 inches below the surface of the road. He was on the spot on the Thursday morning and afternoon, but did not then detect any escape of gas; so that the fracture must have occurred just before the roller left work at 5 p.m., but the gas did not find its way to the surface in any appreciable quantities until later in the evening. There were also two service-pipes fractured; and from these the gas must have travelled in large volumes down the old disused drain (referred to at the inquest) to the point where it had been cut off, which was close to a closet in the house. The floor of the latter was filled up with loose rubble, and was honeycombed with rat runs—giving a direct means of communication between the old sewer and the whole of the house. The report having been read, Major Clark said he understood there had been several fractures of gas-pipes in the Halve; and he thought when such warnings as these had been given to the Gas Company, that they ought to have paid a little more attention to them. The Surveyor observed that he had always found the Company's Manager (Mr. Sainsbury) prompt in attending to any complaints as to pipes being broken. Mr. Walker expressed the opinion that no blame could be attached to the steam-roller; the question was whether the Gas Company ought not to have their mains laid at a greater depth. Further discussion ensued; and in the end the Surveyor was requested to procure a copy of the Company's Act to see what their powers were, and whether they were not compelled to put their pipes at a certain depth.

EUROPEAN GAS COMPANY, LIMITED.

The Annual General Meeting of this Company was held yesterday week, at the London Offices, No. 11, Austin Friars, E.C.—Mr. H. M'LAUCHLAN BACKLER in the chair.

The SECRETARY (Mr. W. Williams) read the notice convening the meeting, and also the following report of the Directors:—

The results of the Company's operations for the past financial year, as estimated by the Directors and expressed by them in the circular issued to the shareholders in January last, have been fully realized.

The general increase in the cost of coals had not, up to the 31st of March last, affected the interest of the Company to any important extent, owing to outstanding three years' contracts at low prices. These contracts having now all run out, the Directors have purchased their supply for the current year on terms, which, although above those of former years, are considerably lower than those required by coal-owners when the great rise took place. The effect will be apparent in the accounts for the present financial year.

Meanwhile coke has been steadily increasing in value. Tar has also been sold on more favourable conditions; and the ammoniacal products show a fractional advantage.

There has been an increase of 2¼ per cent. in the quantity of gas sold during the twelve months; but the rental has, in the aggregate, remained nearly stationary. This somewhat anomalous circumstance is mainly owing to the reduction of price at Havre (already reported to the shareholders), which the Directors had to agree to, in order to secure an addition of 24 years to the tenure of the Company at that station; thereby adding materially to the value of the property. Since the conclusion of this important matter, contracts have been entered into for a similar period, and ending at the same date—*i.e.*, the 31st of December, 1930—in respect of the so-called suburban districts of Graville and Sanvic.

The revision of the Company's capital precludes, in some measure, a comparison with the previous year on equal terms; but the Directors are pleased to report that the whole of the business is in a healthy state, and encourages the hope that the prosperity of the past will be continued in the future.

The works have all been maintained in excellent order; and the outlay for additions has been merely nominal.

The number of gas-stoves now in use at the seven stations is 44,053; being an addition, during the year, of 2220.

Debentures to the amount of £12,900 were paid off at maturity; and the balance remaining on March 31 last was £18,700, since which £10,000 fell due on the 1st of the present month, and was also paid off. The remaining £8700 will be treated in like manner on or before the 1st of July, 1892.

The net profit of the year admits of a dividend at the following rates on the increased capital of the Company—viz., 20s. per share on the fully-paid shares, 15s. per share on those £7 10s. paid, payable, free of income-tax, on the 1st of August next, less the interim dividend of 8s. and 6s. per share respectively paid on Jan. 31 last. After providing for this, a balance of £5111 19s. 10d. will remain, to be added to the reserve of undivided profits.

Notice has been given that Henry Chaloner Smith, Esq., retires at this meeting. The late Mr. Baddeley would also have retired, and, therefore, John Blacket Gill, Esq., who has been appointed by the Board to succeed him, will do so. The Board are grieved to report the death of Mr. Henry Solomon. They have appointed in his place Edward Thomas Edmonds Besley, Esq., subject to confirmation by the shareholders at this meeting. Both Auditors (Frederick John Roan, Esq., and Joseph Reeson, Esq.) also now retire. All the retiring Directors and Auditors, being eligible for re-election, offer themselves accordingly.

The CHAIRMAN said it was very gratifying to the Directors to be able to lay before the shareholders such a statement as that which they this time last year ventured to hope they might be able to produce. The elements of comparison were somewhat difficult on this occasion owing to the increase of the capital, and to the reduction of the price of gas at Havre; but he could assure the proprietors of this—and the Board were thoroughly persuaded of the fact—that the concern was in a very sound position, and that its prospects were excellent. The predictions which the Board had made were justified by the statement they now presented; and they hoped, and ventured to say with some certainty, that the future was a bright one. They had, it was true, some drawbacks. There was the price of coal, which was likely to be higher this year than it had been in the past, because by means of their three years' contracts, they had been able to tide over the great difficulties of the rise which took place some time ago; but they had nearly got into lower prices before they were obliged to renew the contracts for a further period. The Directors therefore made short contracts this time last year; and now they had made their purchases on terms very much better than those which would have had to be paid if they had not had the contracts running for three years. Three-years' contracts had been very much abused in some quarters; and he had even heard it said that those who made them for such periods must be lunatics. They had not found it so in their own case; but on the contrary. In the future the plan of the Directors would be to enter into long contracts when the price of coal was low, and short ones when it was high; and by taking this course, he believed they could not fail to be as successful as hitherto. Now the fact of the gas-rental being somewhat less than last year was explained in the report. It was due to the reduction in the price charged for gas at Havre. Many shareholders who did not understand these things would say: "Why, then, did you reduce the price?" The price was reduced to the extent of 11d. per 1000 cubic feet; and this the proprietors would no doubt think was a very large concession. If, however, the Board had not done this, they would not have secured the contract, which had now 40 years to run (having been extended by 24 years), and would terminate in 1930. This contract was of very great value to the Company—not only as it relieved them from all care for so many years, but also because it set an example (which the Board hoped to see followed) to those other Municipalities who had not yet renewed the contracts which were concluded 35 years ago, at the time the great Paris contract was made. Besides adding very much to the value of the Company's property at Havre, it enabled them to increase the profit at that station in this way: Formerly the Directors placed a certain amount to the depreciation fund so as to write off, before the remaining period of the Havre contract (which was 16 years) came to an end, the whole of the capital invested in that station—although, of course, something would have remained to the Company besides in the shape of works and plant. This, as he had just said, required a certain sum per annum spread over the 16 years; but the moment the contract had 40 years to run, then they extended the depreciation over this longer period. The shareholders would see

at once that this brought into profit a considerable sum. He stated that this might be the case when he referred to the subject at the last annual meeting. It had been proved so; and they might still be able to come into further profits if they succeeded in lengthening the concessions of the two other stations that remained. This being so, they might consider that the property at Havre had increased in value; and consequently the aggregate property of the Company. He might mention that the drawback as regarded coals would affect them, he hoped, for only a short time; the contract being merely for one year. The receipts for coke, tar, and ammoniacal liquor had been more than in the previous year; and consequently they looked to them to recoup them in some measure, if not altogether, for the additional cost of coal. The reserve account (to which they had added this year a considerable sum), after paying the 10 per cent. dividend which they were about to declare, would amount to £102,755. If the Directors found that the effect of the high cost of coals and the reduction in price was not sufficiently recouped by the advance in the bye-products, the shareholders must recollect that they had this fund to fall back upon. This was not a fund on paper; it was actually invested in first-rate securities. They had represented in this way £118,915—that was the amount really invested in securities, which, he believed, were worth more than that at the present time. So the proprietors would see the Directors were not likely to fail in continuing the 10 per cent. dividend. That they would pay more, he should not like to say, because it would be imprudent; but he was in hopes of having the pleasure of submitting something to that effect on a future occasion. Their situation was really an excellent one in all respects. This being the case, he believed the shareholders would be satisfied with the bonus scheme which had been so completely carried out, and which had been accepted by every shareholder in the Company; showing that it was a perfect success. The secret of the Company's prosperity was that the Directors did not undertake any scheme without having rendered themselves thoroughly masters of the details; and so when they submitted anything to the proprietors, they felt confident that success would attend their endeavours. They had had another drawback which he should mention; and that was the increase of the income-tax on joint-stock companies in France. It was formerly 3 per cent.; but last year it was raised to 4 per cent., and they had had to pay £800 more than in the previous year. He did not think there was any probability of the French reducing this tax; and therefore this increased payment was likely to continue. In summarizing what he had said, the Chairman remarked that there was the additional cost of coal to be faced; and the rise in the French income-tax they had already felt the effect of. Against this there was the improved value of the products, and the Company's increasing business. At every station they had additional consumption, if not additional rental; and Havre was the only station, for the reason already stated, where there was any reduction of rental. After the 1st of July next year, there would not be any debenture stock outstanding—they would have paid everything, and be perfectly free from debt; and the reserves for depreciation and equalizing dividend would meet any emergency which was at all like to occur. It was with much regret that he had to refer to the losses the Company had sustained during the year. The death of Mr. Baddeley he alluded to at the last special meeting which was held. Since then Mr. Solomon had been taken from them rather suddenly. He was a man of great judgment, and held a high position in his community; and his advice was listened to with the greatest attention, with the desire to carry it out. The report stated how the Board had filled these vacancies. They were undecided for some time whether or not to appoint someone to the seat vacated by the death of Mr. Baddeley; but they ultimately came to the conclusion that it was not wise to leave the Board with only five members. Therefore they elected Mr. Gill; and they had already experienced the advantage of his assistance in many ways, and to their profit. That gentleman had not allowed the grass to grow under his feet; for he had already visited the various stations of the Company with the Secretary. Mr. Gill, he might add, was the Chairman of one of the three London Gas Companies (the Commercial), and certainly not the least successful of the three. The Chairman concluded by moving the adoption of the report and accounts.

Mr. E. F. WHITE seconded the motion.

The CHAIRMAN, in reply to questions, said that the two stations at which the contracts had not been extended were Boulogne and Amiens. The amount which they had standing to the reserve account was £97,643; and if they added the £5000 odd which would be left after paying the dividend now proposed, it would make the £102,755 to which he had referred.

Mr. BEARD pointed out that the net earnings at Boulogne—£1849—appeared to be ridiculously small compared with the other stations; and he should like to know why this was so.

The CHAIRMAN said the reason was this: That formerly they deducted 5 per cent., but now 4 per cent., on the outlay before returning the net profit. This was a French custom which they had adopted, and with benefit. He would not say exactly the reason why they did this; it did not concern the shareholders particularly, but it concerned them abroad. At Boulogne the outlay had been proportionately much larger than at any other station. At one time the Directors were expecting that a new deep sea harbour would be carried out, and that it would be the means of bringing the Company a good additional consumption. They also anticipated that Boulogne itself would prosper in a much greater degree than it had done. Under these circumstances, they felt bound in common prudence to increase the plant to a larger extent than they would have done, and had done, at other stations. The harbour works had, however, been suspended. The gas-works at Boulogne were on a much larger scale than was really required for present wants; but he hoped the demand for gas would expand, and that they would find ultimately that the capital would not be unprofitable. The honourable shareholder would easily understand that charging 4 per cent. on the unproductive capital caused the net profit to appear considerably smaller at that station than was the case at any other.

The motion was then carried unanimously.

The CHAIRMAN next proposed the dividends mentioned in the report; and in doing so explained that those who were shareholders previous to the conversion of the shares, together with the bonus that was given, would be receiving 2 per cent. more than previously. They then had 13 per cent.; and if they calculated what they would now have on the capital they held before the bonus was added, they would find it would work out to 15 per cent.

Mr. WHITE seconded the motion; and it was carried unanimously.

Mr. Smith and Mr. Gill, the two retiring Directors, were unanimously re-elected, on the motion of the CHAIRMAN, seconded respectively by Mr. F. J. ROAN and Mr. N. E. B. GAREY.

Mr. GILL, in returning thanks for his re-election, referred to his inspection of the various stations of the Company. He said that for the past 20 years he had been more or less connected with the directorship of Metropolitan Gas Companies; and therefore he visited the Company's stations with considerable interest. In the first place, accustomed as he was to London gas-works, he could not help noticing the difference in the general demeanour of their own men and that of the English labourer. The demon of discontent had evidently not found its way across the water; and the good relations existing between employers and employees at the present time should make them continue to look after the men in a kindly manner. He had the good fortune to be introduced to all their Managers; and he was exceedingly pleased with each one—they all seemed to be imbued with a most amazing desire to look after the best interests of the Company. Having mentioned that the Company were the possessors of an interesting and beautiful Norman Chapel at Caen (which had been turned into a store-house for gas-stoves), he proceeded to remark that, when he walked through the streets of Boulogne and Havre, he was struck with the fact that the electric light was making considerable progress. In some places, however, he observed that gas-engines were let out for the purpose of generating the electricity, so that he did not think they would have any cause for complaint. There was no doubt that on the Continent they had in the electric light a serious combatant to contend with; but in this country the cheapness of gas had been very much against its progress. However, the Company had something like 44,000 stoves out on hire; and this to him was an agreeable feature. He might say that in the Commercial Gas Company, they carbonized something like double the quantity of coal that the European Company did; but although they used every effort, they had not let out more than 3300 stoves. The British working man did not seem to realize what a great boon the gas-stove was; and in connection with this, he should like to say that though the European Company had a great number of working-men consumers, the bad debts did not amount to £400. This, he thought, spoke volumes for the honesty and thriftiness of the consumers, and of the admirable manner in which the Company's collectors worked. He concluded by expressing the hope that their Chairman would long be spared to occupy the position he had so ably filled for many years.

The appointment of Mr. E. T. E. Besley as a Director was next confirmed, on the motion of the CHAIRMAN, seconded by Mr. GAREY, and was suitably acknowledged. The Auditors, Mr. F. J. Roan and Mr. J. Reeson, were also re-elected.

The CHAIRMAN said there was one other matter to bring before the shareholders. When the income-tax was first imposed in 1842, the dividends were paid free of income-tax, and also the salaries of the English establishment, and the fees of the Directors and Auditors; and it had recently been brought to the attention of the Directors that perhaps it would have been more regular if, as regarded the Directors and Auditors, the practice had received the sanction of the shareholders. It seemed almost out of place that after 50 years the question should be raised; but as it had been, it was well perhaps the shareholders should authorize the Directors to continue to pay the income-tax out of the funds of the Company. He moved a resolution accordingly.

Mr. MARTIN seconded the motion, and it was unanimously adopted.

The services of the staff and of the Chairman and Directors were suitably acknowledged; and the proceedings then terminated.

JOHANNESBURG GAS COMPANY, LIMITED.

The Company to Take Up Electric Lighting—More Capital Needed.

An Extraordinary General Meeting of the above Company was held at the Cannon Street Hotel last Wednesday—Mr. W. F. LANCE in the chair—"for the purpose of considering certain proposals for the dissolution of the Company and the transfer of its assets and rights to a Company, to be formed in the South African Republic, for the lighting of the town of Johannesburg by gas and electricity respectively, or otherwise for the purpose of considering proposals in connection with the acquisition by the Company of the said concession for lighting by electricity, and the increase, if necessary, of the capital of the Company, or the issue of reserve shares in consideration for, or in connection with, the acquisition of the said concession for lighting by electricity; and for the purpose of adding to, repealing, or altering any of the provisions of the Articles in such manner as may be found expedient in connection with the said acquisition or otherwise."

The SECRETARY (Mr. Taffs) having read the notice convening the meeting,

The CHAIRMAN explained the object of calling the shareholders together, and then briefly reviewed the circumstances which have led up to the present position of the Company. He said the undertaking was floated two or three years ago for the purpose of acquiring and carrying out the concession for lighting Johannesburg by gas. The working capital, however, was all absorbed, owing to an unexpected increase in the expenditure for plant, with the exceptionally heavy outlay for the transport of material from the coast. The cost of plant had been about doubled on the original estimate; the reason for it being that the town of Johannesburg was growing at such a pace that the Directors who were then in office felt that the plant provided for in the original estimate would be insufficient for the purposes in hand. Events subsequently proved that, had the original idea been adhered to, the Company would probably now have been at work, and lighting the town of Johannesburg. The Directors at that time, in exceeding their working capital, relied on being able to dispose of the 70,000 reserve shares of

the Company; but their expectations were not realized. Thereupon a scheme was taken in hand for the issue of debentures to the extent of £50,000; £26,000 of them to be subscribed for in England, and the other £24,000 in Cape Colony. Unfortunately, however, owing to financial strains, the latter amount was not forthcoming. A Committee was appointed to endeavour to raise the money; and eventually an arrangement was come to with the two gentlemen who had guaranteed the £24,000, by which they were to be released from £9500 of their guarantee; leaving them to find £14,500, the balance of the debentures, while they forfeited to the Company 3000 ordinary shares, and waived the sum of £1050 which had accrued from the rent of a coal mine leased from them by the Company. The Company also obtained the right to cancel, on six months' notice, the lease of the mine. These terms were cabled to the Committee in London, who approved of them. He (the Chairman) then proceeded to Johannesburg; and on his arrival there, he found that an electric lighting concession was about to be taken up by a Syndicate, who would start it in a small way within a few weeks. He therefore, under the instructions of the Committee, took such steps as were open to him; and he was enabled to secure this concession. The terms on which it had been obtained were the payment by instalments of £6000 in cash and £8000, or less, in shares, according to the capital of the new Company proposed to be created. The advantage of acquiring this concession was that it gave to the Company the monopoly of lighting Johannesburg, and so preventing the creation of the rivalry with which they were immediately threatened. In addition to this, he was enabled to obtain from the Government of the Transvaal Republic the right not only of amalgamating the gas and the electric lighting concessions, but also of forming an English company to work them together. As to the prospects of such an undertaking, they were, of course, bound up with the future of Johannesburg. Within the past twelve months, however, its position had very considerably improved as a centre of a substantial mining industry; and when he told the proprietors that the last municipal valuation of property was something more than £4,000,000 sterling, he thought they would realize that there had been some money embarked in building—indicating what their confidence was, on the part of those who had found that capital, in the future of the place. There was a population of from 25,000 to 30,000 inhabitants; and this was the extent of the town over which the Company had now the monopoly of lighting. He had gone very carefully into the figures, and was sure he was within the mark in stating that the Company might very safely calculate on a net profit, after paying all expenses of from £20,000 to £25,000 per annum, which would yield a dividend, of upwards of 10 per cent. on a capital of (say) £200,000. Although the production of the electric light in England cost considerably more than that of gas, this was not the case in Johannesburg. The coal they obtained for engines such as those used in electric lighting cost about one-third of that employed for making gas. There was a distinct future for gas in Johannesburg, in connection with cooking and heating; for although it might be said that the inhabitants had coal on the spot comparatively cheap, yet the great difficulty in households was that of domestic labour, and anything that would lessen this would be regarded as a boon. The proprietors might ask how it was proposed to work gas and electricity together. What suggested itself to the Directors at present was that they should make the gas the principal source of lighting, and also supply as much electric light as was found to be requisite. His own feeling was that as yet this light was somewhat in its infancy, and that it would be folly to incur immediately any very large expenditure in connection with it. But it would be necessary to lay down one or more installations in the town; and for this purpose, as well as for properly completing the carrying out of the gas contracts, additional capital would be required. He had gone carefully into the figures, and had placed the amount at £50,000. Various methods had been proposed for obtaining this money. But he suggested that a new Company should be formed, with a capital (say) of £200,000, and that they should give to the existing shareholders one share in the new Company for every two shares held by them in the old one. This would take £65,000. Then there were £50,000 of debentures, which brought up the amount to £115,000; and a further £50,000 to be provided would give £165,000. This would leave £35,000 in reserve wherewith to meet what would have to be paid in raising the £50,000. In conclusion, in order to obtain an expression of opinion from the meeting, he submitted the following resolution, which, he explained, could not be made valid then, as there were not two-thirds of the shareholders represented: "That this meeting approves of the dissolution of the Johannesburg Gas Company, Limited, and the formation of a new Company as an English Company, to be called the 'Johannesburg Lighting Company, Limited,' for the purpose of acquiring and working the concessions for lighting Johannesburg with gas and with electricity respectively—such Company to have a share capital and debenture issue together not exceeding £250,000, of which amount the debenture issue, bearing interest at 8 per cent. per annum, and forming a first charge upon the Company's undertaking and assets, shall not exceed £100,000. And it is hereby resolved that, upon the registration of such Company in England, this Company be dissolved, and all its assets and liabilities transferred to the Johannesburg Lighting Company, Limited, in exchange for debentures of the Johannesburg Lighting Company, Limited—£50,000 to be issued to holders of the existing debentures in the Johannesburg Gas Company, and ordinary shares of the Johannesburg Lighting Company, Limited, for £65,000 to be issued to the holders of existing shares in the Johannesburg Gas Company, Limited, to be distributed by the Directors as liquidators, in the proportion of one share in the Johannesburg Lighting Company for every two shares in the Johannesburg Gas Company, Limited."

Mr. ANDREWS seconded the motion, which was agreed to.

Mr. GARLAND SOPER then moved that the meeting be adjourned for a month.

The motion was carried; and the proceedings closed with a vote of thanks to the Chairman.

Reduction in Gas and Meter Rents at Lymm.—The Lymm Local Board have, on the recommendation of their Gas Manager (Mr. W. Severs), lowered the price of gas 10d. per 1000 cubic feet for cooking-stoves, gas fires, and engines, and reduced meter-rents one-half.

GORING AND STREATLEY GAS AND WATER SUPPLY.

The picturesque villages of Goring and Streatley—charmingly situated on the banks of the Thames a few miles above Reading—were until quite recently altogether unprovided with a gas supply, and were dependent solely upon wells for their water supply. The absence of gas was remediable by the substitution of another illuminant; but the want of a proper service of water was necessarily detrimental to the health of the inhabitants, inasmuch as the wells were liable to contamination from the percolation of sewage matter and other impurities. This was a condition of things which bade fair to militate against the district, not only as a place of residence but as a pleasure resort much favoured by artists and boating men. The occupants of the villages did not, however, take any steps to remedy the defect; and consequently it remained for strangers, possessed of more enterprise, to undertake the work. A number of gentlemen engaged in the business of gas and water supply took the matter in hand with the view of furnishing both these commodities. The result of their deliberations was the formation of the Goring and Streatley District Gas and Water Company, Limited, and an application to the Board of Trade for a Provisional Order to enable the promoters to carry out their intentions. The Chairman of the Company is Mr. E. Walmisley, Parliamentary Agent, of Abingdon Street, who is a Director of the Hornsey and Brentford Gas Companies; the Secretary is Mr. W. H. Hardy, Secretary of the Brighton and Hove General Gas Company; and the Consulting Engineer is Mr. Jabez Church, M. Inst. C. E., F.G.S., of Westminster. As soon as the various preliminaries were settled, a site was secured just outside Goring, and preparations were made for a commencement. But here a difficulty presented itself. It was, of course, highly desirable that the picturesqueness of the locality should not be marred, even in the eyes of the least susceptible, by the erection of unsightly buildings; and therefore this point was kept steadily in view by Mr. Church when designing the works. It is hardly necessary to say that he was thoroughly successful; as the buildings are quite in harmony with those in their immediate neighbourhood. The works comprise a gas manufacturing and a pumping-station combined, together with a house for the Resident Manager, which includes the office. The reservoir, which is capable of holding 100,000 gallons of water, is situated on a hill close by. The construction of the works was entrusted to Messrs. J. and H. Robus, of Bucklersbury, who carried out those of the Mid-Sussex Water Company at Balcombe, under Mr. Church's direction. They were commenced about two years ago, and are now in active operation. As at present equipped, they are equal to the demands upon them; but, of course, they have been arranged so as to be easily extended with the growth of the district. Both gas and water mains have been carried across the river into Streatley. The water is obtained from a deep boring in the chalk; and it is drawn up at the rate of about 10,000 gallons per hour. Its quality is excellent, whether tested by the palate or by chemical analysis. The works were visited last Tuesday by the Chairman of the Company, and Messrs. R. Fish and A. Green, Members of the Board, accompanied by the Secretary, the Consulting Engineer, and Mr. H. J. Robus, one of the Contractors. They were very pleased to learn from the Manager (Mr. Dobson) that there had been recent accessions of both gas and water consumers—a result largely attributable to his active canvassing of the district. Another gratifying fact which the visit revealed was the increase in the number of high-class houses that have been erected in Goring since the works were started two years ago. The boon to the occupants of such establishments of a constant supply of unimpeachable water, cannot be over-estimated; and as the erection of residences of this kind goes on, the demands upon the Company must necessarily increase. Gas, too, will be in greater request, not only for lighting, but for culinary purposes. It has, we believe, been decided by the Directors of the Great Western Railway Company to erect a new and enlarged railway station at Goring, in conjunction with the widening of the line which is now in progress to accommodate the increased traffic; and when this has been put up, the Goring and Streatley Company will be called upon to supply it with gas and water. While, however, the inhabitants testify their appreciation of the Company's services by becoming their customers, they do not manifest any desire to make themselves partners in the undertaking which has been established for their benefit; and consequently the capital to carry on the concern has hitherto had to come from outside. Already a large portion of it has been provided by the Directors and their friends; but there is still about £5000 unallotted, the greater part of which is now required to discharge existing liabilities, and to meet expenses for gas and water fittings. This amount the Directors are offering to the present shareholders and others who are willing to testify their confidence in the stability of gas and water undertakings by investing their capital in them. The contractors at present hold the works on a lease, the term of which will expire in March next. In the three years during which it will have run, the interest paid has risen from 3 to 4 per cent.; and the Directors feel confident that the Company will eventually be in a position to pay their full authorized dividend. Looking at all the circumstances, it seems that this confidence is fully justified.

The Large Waste of Vyrnwy Water.—With regard to the alleged ebormous waste of Vyrnwy water in consequence of defects in the calves of the temporary pipe-line conveying it, it was stated, in the course of a discussion at the meeting of the Vyrnwy Works Committee last Tuesday, that Mr. Deacon denied that 3 million gallons were lost daily in this manner. It was further mentioned that there were 30 million gallons of water from Vyrnwy already in the Prescot reservoir; but it was not deemed advisable to turn this into the Liverpool main until there was a continuous supply of at least 4 million gallons per day from Vyrnwy. In future the quantity reaching the reservoir would be gauged from day to day, and a report showing the amount received presented to the Committee. The supplemental supply was to be 5 million gallons per day; and Mr. Deacon was still confident that his estimate would be realized very shortly.

NOTES FROM SCOTLAND.

From our Edinburgh Correspondent.

EDINBURGH, *Saturday*.

This is the time of the year when all the gas corporations who work under the Burghs Gas Supply (Scotland) Act, and many of the smaller companies, publish the results of their working for the preceding twelve month. My "Notes" this week must, therefore, be almost exclusively devoted to them.

The Arbroath Corporation met last Tursday, and adopted the reports of Mr. R. S. Carlow, the Gas Engineer and Manager, and of the Finance Committee. Mr. Carlow is not particularly well supported by his Board, which is not to the credit of the members of it, because he is a thoroughly competent servant of the Corporation, giving them in all respects quite the utmost return for their outlay which it is possible to realize. There are several conditions which make the gas supply of Arbroath relatively a more difficult business to manage than are similar undertakings in most other places. In the first place, the works are situated on a height—entailing more pressure in the mains; and it is a marvel that Mr. Carlow should in the past year have been able to show only 6·694 per cent. of unaccounted-for gas. Then the Corporation work under the disadvantage of being obliged to hand over half of their surplus profits to the Town Council. Although these have for some years been small, they were not always so; and the practice has a tendency to keep down the gas undertaking. Further, the Corporation pay the high rate of 4½ per cent. interest upon money on loan, which, so far as the Money Market is concerned, they might have at 3½ per cent. These circumstances not being of Mr. Carlow's creating, one would expect him to be specially well supported, in respect of his difficult position; but it seems that at least some members of the Corporation do not know a good servant. Their endeavour seems to be, after having thrust certain disadvantages upon their Manager, to hold him responsible for their consequence. There is no need for such conduct, as Mr. Carlow by skilful management—not without much anxiety, I am afraid—is able, year by year, to show an advance. In his report this year he states that the quantity of gas made was 46,131,300 cubic feet—an increase of 697,100 cubic feet on the previous year; that 4972 tons of coal were used, being an advance of 529 tons; and the gas of an average illuminating power of 25·25 candles had been produced. There was a decrease in the quantity of gas realized per ton of coal; the yield being 9277 cubic feet, which was 948 cubic feet per ton less than in the previous year. This is no doubt accounted for by the inferior coal used during the railway strike. Though the financial statements for the past twelve months showed a satisfactory termination to the year's business, it was necessary, on account of the increase in the cost of coal, to raise the price of gas from 4s. 2d. to 4s. 7d. per 1000 cubic feet. A remit was made to the Works Committee to consider whether they should have the coal which is supplied to the works periodically tested by the Manager or a public analyst. The latter proposal is in accordance with an ugly practice, which appears to be spreading, of having an analyst independent of the manager—a state of matters that is likelier to set up "friction" between departments than to lead to greater efficiency or economy.

The Perth Gas Commissioners had before them on Monday the question of borrowing a further sum of £1000 to complete the extensions at the gas-works, which were authorized by their Act of 1888. The money is to be borrowed for three years at 3½ per cent. Bailie Bridges, the Convener of the Works Committee, could not say, in reply to a question, how much they had borrowed under the 1888 Act; but he thought it was within £600 or £700 of their powers. He added that he would not raise any more. The sum sanctioned by the Act was £20,000, of which they have now borrowed upwards of £19,000. When they started on their extension proposals in 1887, after much hesitancy, they did so on a report by an eminent gas engineer, that the project would cost £13,000. Probably they do not differ in that respect from other bodies; but the result has shown that a much larger amount has been needed. The sum of £20,000 was inserted in their Act, as being sufficient to meet their requirements for a number of years. Yet they are already in difficulties; for at this week's meeting a letter from Mr. T. Whimster, the Gas Manager, was read, asking the Commissioners to supply him with additional purifiers, as there was danger of impure gas being produced if more purifying power was not procured. But the financial position of the Commission will not allow of further expenditure upon the works in the meantime; and so Bailie Bridges, as explained by himself, has persuaded Mr. Whimster not to ask for the new purifiers for another year. It is satisfactory to have a prosperous business such as the Perth Gas Commissioners have. Their output has advanced upwards of 12 million cubic feet—an increase of one-seventh, during the past three years; but it is a question if it is good policy to stint the means of production, which is what Bailie Bridges seems to be doing.

The Kirkcaldy Gaslight Company held their annual meeting on Tuesday. It was reported that the output of gas had increased during the year from 64,845,000 cubic feet to 70,881,000 cubic feet; and that there was a net profit of £3618. The customary dividend of 7s. 6d. per share was declared, absorbing £2756; and the balance was disposed of by adding £500 to the depreciation fund, and £362 to the reserve fund. The price of gas, which last year was raised by 2½d. per 1000 cubic feet, was again raised this year by a similar sum—making it 3s. 6½d. per 1000 cubic feet.

The shareholders of the Montrose Gaslight Company meet on Wednesday, when it was reported that the income for the past year was £6194, and the expenditure about £4000, leaving a balance of profit of £2194 The usual dividend of £3 per share was paid. To meet this, however, it was stated that it would be necessary to draw upon the reserve fund.

The Alloa gas accounts for the past year are exceedingly satisfactory; there being a total income of £7168, as compared with £6334 in the preceding year. Of the revenue, gas and meter rents produced £6049, as compared with £5435; while the return from tar and ammoniacal liquor rose from £649 to £822. In this state of matters, Mr. D. Thompson, the Convener of the Gas Committee, explained that it would not be necessary, although coal would cost £460 more than last year, to raise the price of gas from 3s. 4d. per 1000 cubic feet. The output of gas, which had been growing year by year, increased last year by 12½ per cent.—the largest increase ever had. They expected soon to have to expend £5000 in providing additional gasholder accommodation; but they were hopeful that, notwithstanding this outlay, they would be able to carry on without raising the price of gas.

It is always a pleasure to write as to the affairs of the Berwick and Tweedmouth Gaslight Company, because their reports have a cheery tone about them which can only be associated with a prosperous and well-managed concern. The annual meeting of the Company was held on Wednesday; and it was reported that the income for the year had been £5621, and the expenditure £4415, leaving a surplus of £1206. The Company did not raise the price of gas last year; nor have they raised it this year—the Chairman explaining that they have made contracts for coal which, although at a considerable rise in price, will enable them to go on without any advance of price. The dividend of 10 per cent., he also explained, had been earned, and was not being paid out of the reserve fund. A comparison of returns brings out how satisfactorily progressive the Company's business is. In the year before last, the income was £5146; the expenditure, £3898; and the surplus, £1247. Two years before that, the income was £5068; the expenditure, £3917; and the surplus, £1150.

The Elgin Gas Commissioners suffered during the past year from their inland position, which makes them entirely dependent upon the railway service, and also from (in the troubled circumstance of the time) the long railway journey which their coal requires to be carried. Their output of gas was 13,374,900 cubic feet—a decrease, as compared with the previous year, of 141,600 cubic feet; but an increase of 36,400 cubic feet as compared with the year preceding. The revenue last year was £3926, as compared with £3784 in the previous year, or an increase of £142, which was entirely made up by better returns from tar and coke. On the expenditure side, coal rose from £1825 to £2120. The entire charges for the manufacture of gas advanced from £2379 to 2855, or an increase of £476. Other items of expenditure also show an increase; and there was a net loss on the year's working of £463. The estimates for the year were framed to provide for a deficiency of £158; so that the result is by no means discouraging. During the year the Commissioners expended £1095 upon extensions of works; and to meet this, and further extensions, they resolved on Monday to borrow £3000. The price of gas was advanced from 5s. to 5s. 5d. per 1000 cubic feet.

In Peterhead, the output of gas last year showed an increase of 2,125,900 cubic feet; and the revenue derived from gas rose from £3885 to £4475. The price of coal rose from £1579 to £2161. The profit was £1328, as compared with £1063 in the previous year. The price of gas is to be maintained at 5s. 10d. per 1000 cubic feet.

The Portobello Gas Company had a total income of £7466, an expenditure of £5097, and the net profit amounted to £2251. A dividend of 8 per cent. was paid on the capital of £20,000; a sum of £335 was written off for depreciation; and the balance of £315 was carried to reserve. The previous year's income was £6361. There is thus an increased revenue of £1105; but this is almost counterbalanced by an increase of expenditure from £4623 to £5097, or £1074.

Of other and smaller Gas Companies, the following are reported this week: Lochgelly, a dividend of 5 per cent.; Markinch, a dividend of 7½ per cent., as compared with 10 per cent. last year; and Auchtermuchty, a dividend of 5 per cent., and the price of gas reduced from 7s. 6d. to 6s. 8d. per 1000 cubic feet.

As I have already stated, an unfortunate difference has arisen between the Falkirk and Larbert Water Trustees and Messrs. D. Y. Stewart and Co., of Glasgow, the contractors for the construction of the new water-works. The Trustees are placed in a position not so favourable as they might be through their having urged the contractors to complete the works too hurriedly, in order to have them ready to suit a certain date for the opening ceremony, which was held about six months before it should naturally have taken place. The works have never given satisfaction; the Earl's Burn reservoir, in particular, which is the largest piece of work in connection with them, having shown a very disquieting tendency to leak. Numerous meetings of the Trust and of its Committees have been held in private over the matter; and Mr. Reid, C.E. (of Messrs. Leslie and Reid, Edinburgh), has, at their request, already examined the reservoir. I suppose it is upon his suggestion that the Trustees lately resolved to call in the services of Mr. Gale, C.E., of Glasgow, the Arbiter named in their Act of Parliament. Meanwhile the Trustees are waiting to see whether Mr. Gale will act. It is perhaps the most disappointing feature of the situation that the Trustees not only suspect the contractors of not having executed the work aright, but they (or perhaps I should say some of them) appear to doubt whether their own Engineer (Mr. Copeland, C.E., of Glasgow) exercised sufficient vigilance over the contractors while the work was proceeding.

From our Glasgow Correspondent.

GLASGOW, *Saturday*.

It is announced to-day that the statement of revenue and expenditure of the Greenock Corporation gas supply undertaking for the year ending June 30 has just been completed, and will be formally laid before the next meeting of the Police Board. The accounts show a balance to the good of a little over £2000, as against £3456 last year. The shrinkage in the balance this year is attributed to the advance in the price of coal and to the increase in stokers' wages, consequent on the change made in their hours of working.

Paisley, which is in the same county, has also been doing something in the gas line this week; the annual meeting of the Gas Trust having been held on Thursday night to receive the statement of accounts and balance-sheet from the Gas Committee and fix the price of gas for the following year. Considering the fact that the tenders for coals were only opened the same evening, and have yet to be examined in detail and deliberated upon, it does seem a little strange that the price of gas for another year has already been settled. All the same, this has been done; and, as is usual in such meetings of the Paisley Gas Commissioners, it has been done in a sort of "full-dress debate." In a meeting of nine out of sixteen members of the Gas Trust, it was resolved (by five votes against four) to continue the price at 2s. 10d. per

1000 cubic feet, instead of reducing it to 2s. 8d. The discussion upon the subject was an exceedingly interesting one; and as has been the case formerly, the principal advocate of a reduction in price was the Convener of the Gas Committee (ex-Bailie Macfarlane), while the policy of "as you were" was maintained chiefly by ex-Provost Cachran, who wants money from the gas profits for public improvements without depending on a direct rate through the Police Department for the payment of the same. On this question of making the annual gas surpluses the "milch cow" of the Corporation, in the way of providing for the costs of public improvements which have got no earthly connection with gas supply and gas consumption, I may mention that during the past four years these surpluses have been drawn upon that way to the extent of about £26,000; and it is not unlikely that this year's surplus will have to yield up at least £4000 for the same class of demands. Without enlarging just now on the year's financial results of the Paisley gas supply undertaking, I may say that it is in an exceedingly healthy condition; and all the facts of the case abundantly show that in the person of their Engineer and Manager (Mr. G. R. Hislop), the Gas Commissioners have a very able, competent, and zealous servant, with whom they have abundant reason to feel pleased.

I have also something to say regarding gas affairs in Johnstone, which is likewise a Renfrewshire town. The annual statement of the Gas Committee was laid before the Burgh Commissioners last Monday evening. It showed that the total revenue was £4778; and that the income from gas sold amounted to £4050, while the interest paid on loans and the amount paid for wages were, respectively, £824 and £811. The returns showed, however, there was a "fly in the ointment," there being a net loss of £286 on the year's operations.

The annual general meeting of the Irvine Gaslight Company was held last Tuesday. In the absence of the Chairman (ex-Provost Paterson), Mr. W. M'All presided. An abstract statement of receipts and expenditure for the year ending July 1, 1891, was submitted by the Secretary (Mr. Dickie). The balance-sheet showed that the amount available for dividend was £1647; and out of this, on the recommendation of the Directors, it was resolved to declare a dividend of 10 per cent. It was agreed to continue the price of gas at 3s. 9d. per 1000 cubic feet, as during the past year. Considering the price and illuminating power of gas in towns of similar size to Irvine, the Chairman thought that consumers would have every reason to be satisfied with gas at 3s. 9d. per 1000 feet. Mr. Walker, the Manager reported that the works were in good condition; that there had been a large increase in the consumption during the year; and that the quality of the gas had been well maintained—the illuminating power being equal to 27 standard candles. He also stated that new retorts would be put in during the summer. The extensions and improvements that had been sanctioned by the Directors will practically exhaust the Company's reserve fund, which now amounts to £253.

The Falkirk Gas Company's Directors have resolved to advance the price of gas to 4s. 2d. per 1000 cubic feet, the increase probably counting from next October. In this case the advance is from 3s. 9d. per 1000 feet. As bearing on this subject, I may mention that at the last meeting of the Town Council and Police Commission, the Lighting Committee reported that they had received letters from Stirling, Airdrie, Dunfermline, Kirkcaldy, Galashiels, and Hawick—all "Company" towns—and other places as to prices charged to the Police Commissioners in connection with the supply of gas; and it was agreed that a Committee should be appointed to endeavour to get some consideration from the Gas Company in lieu of wayleave for street-mains. Mr. Baird said he believed that the Directors had something to propose, and he thought it would be better to delay appointing a Committee until they learned what it was. The suggestion was agreed to. I may say that the price per lamp at Falkirk is 30s. per annum. At a meeting of the Directors of the Gas Company, held on Thursday, the following resolution (which was passed by a meeting of shareholders held previously) was considered and unanimously agreed to: "That the Directors be authorized at any time they may think proper to apply to Parliament for powers to supply Falkirk and district with gas, and with any other means of lighting that they may consider expedient, including the incorporation of the Company, the increase of capital, the acquisition of all powers requisite for the above purposes, and the alteration or abandonment of the existing rules and regulations of the Company, so far as necessary in the circumstances."

At Millport, a dividend of 7 per cent. has been declared, and the price of gas is to remain unchanged; at Largs, an advance of 5d. has been made in the price of gas; and at Blantyre, the price has been advanced from 3s. 9d. to 4s. 2d. per 1000 cubic feet. At Selkirk, it has been announced that the price of gas is to be raised 10d. per 1000 cubic feet—from 3s. 4d. to 4s. 2d.

No material change has taken place in the price of pig iron warrants in the Glasgow market, and all business is now suspended for the holidays.

The coal trade in the West of Scotland has been rather brisker this week; shippers, owing to the approaching holidays, being anxious to have their orders executed before the collieries knock off. Finest house coal is, however, in very limited demand, the consumption being small. The export demand for nuts has been improving; and the large quantity that has been standing in trucks at the pits and the shipping ports is getting cleared off. Dross is very plentiful. The following are the prices per ton f.o.b. at Glasgow Harbour: Splint, 8s. 6d. to 8s. 9d.; main coal, 7s. 6d. to 7s. 9d.; steam, 10s. to 10s. 9d.; ell, 8s. 9d. to 9s. 3d.

Messrs. Cutler's Water-Seal Valves.—We learn that Messrs. S. Cutler and Sons have just received instructions to provide a set of 24 of their patent water seal valves for the new purifiers now in course of construction for the Bradford Road station of the Manchester Corporation, where these valves have for several years been in use. There are at present 24 large purifiers fitted with the valves at the various stations of the Manchester Corporation. We also understand that Mr. Valon has decided to adopt these valves at the Ramsgate Gas-Works, In connection with the new purifiers for which tenders were invited in our advertisement columns a few weeks since.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *July* 18.

Sulphate of Ammonia.—Owing to the paucity of parcels for present delivery, prices are nominal; the low quotations of the dealers meanwhile keeping prices at their previous level. A good business would be possible for future delivery; but contracts are scarcely obtainable. A few small transactions are reported at £11 to the end of the year, and at £11 2s. 6d. to £11 5s. for October to March delivery. Makers thinking well of the future generally refuse these prices for forward delivery. Nitrate is dull but steady at 8s. 6d.

LONDON, *July* 18.

Tar Products.—A fairly good business is being done in most products. In benzol, 50 per cent. is more easy to sell; and the market quotation is slightly better. But 90's are scarce; and although quotation is nominally 3s. 10d., it is believed buyers would pay 4s. for spot. delivery. Common tar oils are weak in price; but the demand is distinctly better. Still there are large stocks in distillers' hands; and with the advance of the season, they are anxious to get a clearance, which no doubt accounts for the low prices being paid. There is a little more life in anthracene; and business is reported, both for "A" and "B" quality, at prices quoted below. Pitch is firm; and a large business is being done for next season's delivery, It is somewhat surprising that, with the decreasing value of coal and other fuel, pitch retains its price; but this probably arises from the large shipments which it is reported are being made to the United States. Prices: Tar, 23s. to 29s. Pitch, 34s. to 35s. Benzol, 90 per cent., 3s. 10d.; 50 per cent., 2s. 9d. Toluol, 1s. 7d. Solvent naphtha, 1s. 5d. Crude naphtha, 1s. 2d. Creosote, 1¾d. Carbolic crystals, 6d.; crude, 60's, 1s. 4d. Cresol, 8d. Anthracene, "A" quality (nominal), 1s. 4d.; "B," 10½d. to 11d.

Sulphate of Ammonia.—There is very little inquiry for this article: and any business going is in second hands. Fortunately the produc- at the moment is small; and makers are pretty easy about the market. At the same time, experienced business men declare that never in the history of the ammonia trade has sulphate been so weak and unsaleable. The little business that has been done has realized from £10 10s. to £10 12s. 6d. less 3½ per cent. discount. Gas liquor is quoted at 4s. to 5s.

THE LANCASHIRE GAS COAL TRADE.

From Our Own Correspondent.

There is no specially new feature to notice with regard to the gas coal trade of this district since my last report; and the principal contracts having now been settled, the remainder of the business during the season will be confined to comparatively small quantities. With regard to business that has been done, there are many complaints amongst colliery-owners that second-class coals which have hitherto scarcely been regarded as gas-making coals, have been offered under tender at extremely low figures, with the result that consumers have in many cases been induced to give them a trial; and this has tended to weaken the position of those who have been holding out for something like last year's rates for the better qualities of gas coal. A considerable quantity of common gas coal has in this manner, I understand, been sold in the Yorkshire district—some of it finding its way into this market; but the leading colliery firms there have generally been holding pretty firmly for about 10s. per ton for good screened gas coals at the pit mouth. In the Lancashire district, there has also been a considerable quantity of the lower class gas coals offered to gas companies and corporations; and in many instances, colliery proprietors have been able to place contracts for these at low figures. From what I have heard, this will probably induce other colliery-owners, who have not hitherto been offering their second-rate qualities of gas coal, to push these forward during next season as alternative supplies at low prices, in order to meet the competition which has been inaugurated to such a large extent during the present season with cheap gas coals. As to the better qualities of screened gas coals, there is no change to report upon the prices which have been recently quoted; and these still range from 9s. 6d. to 10s. per ton, although probably the bulk of the business which has been done has been nearer 9s. 6d. per ton than 10s. Cannel (supplies of which are being gradually worked out) has, on the other hand, shown a very decided hardening tendency. For ordinary descriptions of cannel, colliery proprietors have been getting quite 1s. advance per ton upon last year's rates; whilst for some of the special sorts, which are now becoming scarce, prices have got to a very high point. But with so many varieties of cannel, any definite quotations can scarcely be given, as there is a margin of quite 10s. to 15s. per ton between different qualities. For other descriptions of round coal, the demand continues quiet, and for the better qualities, there is necessarily only a limited inquiry for house-fire purposes as the natural result of the season of the year. At most of the collieries, stocks are now beginning to accumulate; but it is only in very exceptional cases where any large weight has so far been put down, and the prospects are that colliery-owners will enter upon the ensuing winter with considerably less than their average quantities of stock. In view of this, prices for the better qualities of round coal are still being as a rule firmly maintained at practically winter rates. For best Wigan Arley, quotations remain at from 12s. to 12s. 6d. per ton; seconds, 10s. 6d. to 11s.; Pemberton, 10s. to 10s. 6d.; and for common house-fire coals, 9s. to 9s. 6d. per ton. In fact, colliery proprietors show no disposition whatever to press sales of surplus supplies, as they prefer to put these down into stock rather than make any concession upon their present list rates. Common descriptions of round coal are moving off only moderately for iron making, steam, and general manufacturing purposes; and for these, prices, if anything, show rather a tendency to weakness, but not to any general quotable extent. For inland requirements, steam and forge coals at the pit mouth average 7s. 9d. to 8s. 3d. per ton, with locomotive coals averaging 8s. 3d. to 8s. 6d. per ton. For shipment very low prices continue to be taken, to effect clearance sales of surplus supplies; and

common steam coal is offering freely at about 9s. to 9s. 6d. per ton delivered at the High Level, Liverpool, or the Garston Docks. Engine classes of fuel show a want of firmness, owing to the keen competition of inferior descriptions of slack, cheap supplies of which are coming in here in large quantities from outside districts. At the pit mouth, burgy does not average more than 6s. 9d. to 7s. 3d.; best qualities of slack, 6s. to 6s. 6d.; and common sorts are readily obtainable at 3s. 9d. to 4s. 3d. per ton.

Northern Coal Trade.—The northern coal trade is now firmer, with a fuller demand, especially for gas coals, for which there is an increased inquiry owing to the lengthening of the nights as well as to the extended use of gas. Price varies—an occasional contract being booked at about 9s. per ton. The general quotation is 9s. 6d., free on board, for the best Durham qualities; and even this has been refused. Some comment is being made on the action of the Middlesbrough Gas Committee in declining to accept tenders from any but colliery-owners; it being thought by some that the delay will cause figures to be higher for the coal. Bunker coal is dull, at from 8s. 9d. for unscreened to 12s. for best Durham screened coal. Coke is rather steadier; a serious pit-head fire at the West Stanley Colliery having reduced the output for a time. Best blast-furnace coke is quoted at 16s. per ton, free on board. Gas coke is unaltered.

Yeovil Gas Company.—In the report of the Directors of this Company to be presented to the shareholders at the annual general meeting on the 27th inst., it is stated that the profit on the year's working will allow the payment of a dividend of 10 per cent., and leave £1100 to be carried forward. It is satisfactory to find that the series of public lectures on cooking arranged by the Directors in March last proved to be very successful, and resulted in largely extending the use of gas.

Local Authorities and Electric Lighting in London.—An important decision was come to by a Committee of the House of Lords last Thursday, when the Bill to confirm a Provisional Order for the electric lighting of the parish of St. Luke's, Chelsea, came before them. The questions at issue were amendments made by their Lordships constituting the Vestry of St. Luke's the electric lighting authority instead of the London County Council. The Committee, after further considering their amendments, decided to adhere to their decision to make the Vestry the electric lighting authority for their own district. This decision is one of great moment, as it sets aside the principle contained in all former Electric Lighting Orders relating to London, in which the County Council have concurrent jurisdiction with the local authority in regard to electric lighting.

A Gas Company Stealing Water.—A gas company stealing water has aroused, says the *Engineering and Building Record*, some interest at St. Catherines, Ont. It appears that when the water-works were first opened, the Gas Company in question made connection with one of the street mains to supply a fire hydrant in the gas-works yard. This hydrant was represented to be used for the protection of the Company's buildings; and no charge was made for the service. For some time, however, it was suspected that water from this source was being used in the Company's manufacturing operations; and, in order to secure the necessary evidence, it was decided to introduce a harmless coloured mixture into the Company's pipe supplying the hydrant in their yard. This was accomplished, with the result, it is said, of conclusively proving the illegitimate use of the water by the Company. The water-works superintendent estimates that the Gas Company have been using 100,000 gallons of water daily, presumably since the introduction of the new process, some three or four years ago. If paid for at schedule rates, this amount represents $1·40 a day, or (say) $500 a year.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

(For Stock Market Intelligence, see ante, p. 110.)

Issue.	Share	When ex-Dividend.	Dividend or Div. & Bonus.	NAME.	Paid per Share	Closing Prices.	Rise or Fall in Wk.	Yield upon investment
£			p. c.	GAS COMPANIES.				£ s. d.
590,000	10	10 Apl.	10½	Alliance & Dublin 10 p. c.	10	17—18	..	5 16 8
100,000	10	,,	7½	Do. 7 p.c	10	11½—12½	..	6 0 0
300,000	100	1 July	5	Australian (Sydney) 5 % Deb.	100	104-106	..	4 14 2
100,000	20	28 May	8	Bahia, Limited	20	15—17	..	9 8 3
200,000	5	13 May	7½	Bombay, Limited	5	6½—7	..	5 7 1
40,000	5	,,	7½	Do. New	4	4½—5¼	..	5 14 1
380,000	Stck.	26 Feb.	12½	Brentford Consolidated	100	220—225	..	5 8 10
125,000	,,	,,	9½	Do. New	100	160—164	..	5 12 10
220,000	20	12 Mar	11½	Brighton & Hove Original	20	40—42	..	5 9 6
320,000	20	10 Apl.	11½	British.	20	43—45	..	5 0 0
50,000	10	12 Mar.	11	Bromley, Ordinary 10 p. c.	10	18—20	..	5 10 0
39,000	10	,,	8	Do. 7 p. c.	10	13—15	..	5 6 8
328,750	10	13 Nov.	6	Buenos Ayres (New) Limited	10	7½—8¼	..	—
200,000	100	1 July	6	Do. 6 p. c. Deb.	100	92—97	..	6 3 9
150,000	20	26 Feb.	8	Cagliari, Limited	20	25—27	..	5 18 6
550,000	Stck.	10 Apl.	13¾	Commercial, Old Stock	100	255—265	..	5 3 9
130,000	,,	,,	10¾	Do. New do.	100	190—200	−5	5 7 6
130,000	,,	26 June	4½	Do. 4½ p. c. Deb. do.	100	119—124	..	3 12 7
557,320	20	11 June	13	Continental Union, Limited	20	46—48	..	5 8 4
242,680	20	,,	13	Do. New '69 & '72	14	—	..	—
200,000	20	,,	10	Do. 7 p. c. Pref	20	38—40	+1½	5 0 0
75,000	Stck.	25 Mar.	10	Crystal Palace District	100	200—205	..	4 17 7
486,090	10	28 Jan.	10	European, Limited	10	20—21*	..	4 15 3
354,060	10	,,	10	Do. Partly paid	7½	14½—15½*	..	4 16 9
5,470,630	Stck.	12 Feb.	13	Gaslight & Coke, A, Ordinary	100	240—245	+2	5 6 1
100,000	,,	,,	4	Do. B, 4 p. c. max.	100	96—99	..	4 0 9
665,000	,,	,,	10	Do. C, D, & E, 10 p.c. Pf.	100	256—261	+1	3 16 7
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	100	120—125	..	4 0 0
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	100	175—180	..	4 3 4
1,300,000	,,	,,	7	Do. H, 7 p. c. max	100	162—166	+2	4 4 4
463,000	,,	,,	10	Do. J, 10 p. c. Prf.	100	254—259	+1	3 17 3
476,000	,,	,,	—	Do. K, 6 p. c. Prf.	100	155—160	..	3 15 0
1,061,150	,,	11 June	4	Do. 4 p. c. Deb. Stk.	100	112-115	..	3 9 7
294,850	,,	,,	4½	Do. 4½ p. c. do.	100	120-125	..	3 12 4
908,000	,,	,,	6	Do. 6 p. c. do	100	163-168	..	3 11 5
3,800,000	Stck.	13 May.	12	Imperial Continental	100	225-230	+1	5 4 4
75,000	5	26 June	6	Malta & Mediterranean, Ltd.	5	4¾—5·	..	6 0 0
560,000	100	1 Apl.	5	Met. of Melbourne, 5 p. c. Deb.	100	111—113	..	4 8 6
541,920	20	11 June	6½	Monte Video, Limited.	20	17½—18½	..	7 0 6
150,000	5	28 May	10	Oriental, Limited	5	8¾—9	..	5 11 1
60,000	5	25 Mar.	7	Ottoman, Limited	5	4¾—5¼	..	6 7 3
166,870	10	26 Feb.	2	Pará Limited.	10	3—4	..	—
420,000	100	4 May	6	People's Gas of Chicago— 1st Mtg. Bds..	100	92—97	..	6 3 9
500,000	100	1 June	16	2nd Do.	100	90—95	..	6 6 4
150,000	10	28 Apl.	10	San Paulo, Limited	10	14½—15½	−½	6 9 0
500,000	Stck.	26 Feb	15½	South Metropolitan, A Stock	100	284—289	+2	5 7 3
1,350,000	,,	,,	12	Do. B do.	100	242—246	+1	4 17 7
166,500	,,	,,	13	Do. C do.	100	242—250	..	5 4 0
678,000	,,	26 June	5	Do. 5 p. c. Deb. Stk.	100	139-143	..	3 10 0
60,000	5	12 Mar.	11½	Tottenham & Edm'nton, Orig.	5	11—13½ *Ex div.	..	4 8 5
				WATER COMPANIES.				
729,281	Stck.	26 June	10	Chelsea, Ordinary	100	260—265	−2½	3 15 6
1,720,560	Stck.	10 Apl.	8	East London, Ordinary	100	212—217	..	3 13 9
544,440	,,	26 June	4½	Do. 4½ p. c. Deb. Stk.	100	138—143	..	3 3 0
700,000	50	11 June	8	Grand Junction	50	107—111	..	3 12 0
708,000	Stck.	12 Feb.	10½	Kent	100	265—270	..	3 17 10
1,043,800	100	26 June	9½	Lambeth, 10 p. c. max.	100	236—241	+1	3 18 8
406,200	100	,,	7½	Do. 7½ p. c. max.	100	192—197	..	3 16 2
260,000	Stck.	25 Mar.	4	Do. 4 p. c. Deb. Stk.	100	118—123	..	3 5 0
500,000	100	12 Feb.	12½	New River, New Shares	100	347—352	..	3 8 10
1,000,000	Stck.	28 Jan.	4	Do. 4 p. c. Deb. Stk	100	125—128	..	3 2 6
902,300	Stck.	11 June	6½	S'thwk & V'xhall, 10 p. c. max.	100	167—171	..	3 16 0
126,500	100	,,	6½	Do. 7½ p. c. do.	100	160—165	..	3 18 9
1,155,066	Stck.	11 June	10	West Middlesex.	100	250—260	..	3 16 11

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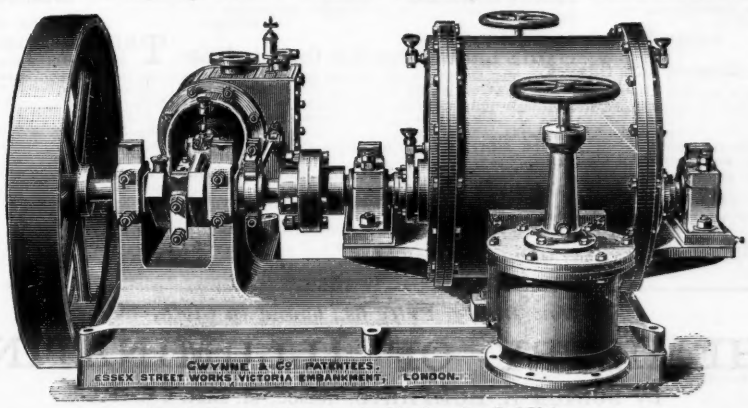

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Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS should be received not later than the FIRST POST on SATURDAY.

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Applications, with references, to be sent in not later than the 30th inst., to No. 1978, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

JAMES LAWRIE & CO. supply Best SCOTCH CANNEL COALS, Best FIRE-CLAY RETORTS, BRICKS, TILES, and LUMPS; BOILER SEATING BLOCKS, FLUE COVERS, and SILICA BRICKS for SPECIAL FURNACE WORK; COKE BARROWS, BOGIES, and SMALL WAGONS.
Postal Address: 1, WHITTINGTON AVENUE, E.C.
Telegram Address: "EIRWAL LONDON."

W. C. HOLMES & Co., Huddersfield, AND 80, CANNON STREET, LONDON,
Contractors for Gas-Works complete, Makers of Gasholders, Purifiers, Scrubbers, Condensers, Retort Fittings, &c., Improved Valves, Engines, and Exhausters. Also for Collingwood's Regenerative Retort-Settings.
*** See Advertisement p. 92 of this week's issue.
Cablegrams: "Ignitor London." Telegrams: "Holmes Huddersfield."

J. & J. BRADDOCK, Globe Meter Works, Oldham.
First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.
Telegraphic Address: "Braddock, Oldham."

TUBES.

FOR Gas, Steam, and Water; Galvanized, White Enamelled, and Hydraulic Tubes, &c.
JOHN SPENCER, Globe Tube Works, WEDNESBURY, and 14, Great St. Thomas Apostle, LONDON.

COZE'S Automatic Apparatus for CHARGING AND DISCHARGING GAS-RETORTS. For Illustrated Advertisement of this System, see p. 41.
Inquiries should be addressed to THE AUTOMATIC COAL-GAS RETORT COMPANY, LIMITED, 86-88A, LEADENHALL STREET, E.C.

RAILWAY Tanks for Hire or Sale.
Address BROTHERTON AND CO., Ammonia and Tar Distillers, LEEDS.

HUTCHINSON BROTHERS, Barnsley, Gas Engineers and Contractors, Makers of Wet and Dry Gas-Meters and General Gas Apparatus, Sulphate of Ammonia Plant, Lead Saturators, Tanks, &c., Tools and Sundries.

CLEETHORPES GAS COMPANY.

STOKER WANTED, used to Engine and Exhauster. Wages 32s. 6d. per week. Constant employment. None but thoroughly trustworthy and capable men need apply.
E. J. BROCKWAY, Manager.

WANTED, a first-class Representative to a firm of Gas-Stove Manufacturers, with influential connection amongst Gas Companies in London, Midlands, and North.
Apply to No. 1979, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C., stating connection, experience, and terms.

GOOD Main and Service Layer wanted for job in provincial town. Mains up to 8-inch diameter.
Apply, by letter, to S. CUTLER & SONS, 16, Gt. George Street, WESTMINSTER, S.W.

THE Directors of the South Petherton Gas Company invite TENDERS for the supply of about 300 tons of GAS COAL, delivered at Martock Station, G.W.R.
Tenders to be sent to the undersigned not later than Monday, the 27th inst.
THOS. STORMONT,
Manager.

THE Littleborough Gas Company invite TENDERS for about 3000 tons of unscreened GAS COAL or NUTS, to be delivered at the Littleborough Station, during the period ending June 30, 1892, in such quantities from time to time as may be required.
The deliveries to be free from Pyrites, Shale, and Dirt.
Tenders to be addressed to the Chairman not later than the 28th inst.
The Directors do not bind themselves to accept the lowest or any tender.
JOHN COCKCROFT,
Secretary.
Littleborough,
July 13, 1891.

IRISH BOG ORE OXIDE OF IRON.

GAS PURIFICATION.

BALE, BAKER, & CO., direct Importers from Ireland. Sample and Price on application. OXIDE PAINT, SULPHURIC ACID, & Chemicals.
120 and 121, NEWGATE STREET, LONDON, E.C.

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Chemical Works, LEEDS, specially produce this ACID from BRIMSTONE, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

JOHN RILEY & SONS, Chemical Manu- facturers, Hapton, near Accrington, are MAKERS of SULPHURIC ACID, from Brimstone, for Sulphate of Ammonia making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol. References given to Gas Companies.

OXIDE OF IRON. Genuine Natural Bog ORE. QUALITY AND CONDITION GUARANTEED. Any quantity supplied at lowest rates.
D. M. NELSON AND SONS, GLASGOW. Telegraphic Address: "Gas Glasgow." Depôts throughout England and Scotland.

SADLER AND CO., LIMITED, MIDDLESBROUGH; ULVERSTON (BARROW); PORTSMOUTH; CARLTON; STOCKTON; 70, Wellington Street, GLASGOW; 58, Fountain Street, MANCHESTER; and 96, Reade Street, NEW YORK. Tar Distillers, Manufacturers of all TAR PRODUCTS, ALIZARINE and other TAR COLOURS, BICHROMES, OXALIC ACID, ALKALIES, LIQUOR AMMONIA, AMMONIA SULPHATE, &c.
Head Office: MIDDLESBROUGH. Correspondence invited.

MEIKLEJOHN'S PATENT IMPROVED SLIDE-VALVE ANTI-DIP.

DURING the illness of Mr. Neill Meiklejohn, Sole Patentee and Manufacturer of the above, all communications should be addressed to C. MEIKLEJOHN, Gas Engineer, OLDBURY.

FRIEDRICH LUX, Ludwigshafen am Rhein; and at No. 142, Great Portland Street, London, W.
LUX'S Gas Regulators for every consumption.
LUX'S single-stem Pressure-Gauges.
LUX'S Regulator for Gas-Engines.
LUX'S Gas-Balance.
LUX'S new Gas Regulator for Inverted Lamps; and other Apparatus for Gas Lighting, &c.

COUNTY BOROUGH OF HUDDERSFIELD.

THE Gas Committee of the Hudders- field Corporation are prepared to receive TENDERS for the supply of about 300 tons of OXIDE OF IRON, which they may require during the ensuing Twelve months, delivered at Hillhouse Railway Depôt, Huddersfield, carriage paid.
Tenders to state the percentage of Iron each ton of Oxide contains, and also the quantity per cent. of Moisture contained therein, which shall not be exceeded in each and every ton of the material delivered.
Tenders to be addressed and sent to Mr. John Burgess, Gas-Works Engineer, Leeds Road, Huddersfield, not later than Tuesday, Aug. 4, 1891, endorsed "Tender for Oxide."
By order,
H. BARBER,
Town Clerk.
Huddersfield, July 15, 1891.

BOROUGH OF DARWEN.

SUPPLY OF COAL AND CANNEL.

THE Corporation are prepared to receive TENDERS for the supply of about 8000 tons of best screened GAS COAL, and 3500 tons of CANNEL, to be delivered at the Gas-Works Siding, Darwen, in the Corporation Wagons, before June, 1892.
Further information, particulars of deliveries, and forms of tender may be obtained from Mr. Thomas Duxbury, Gas Engineer, Darwen.
Sealed tenders, endorsed Tender for "Coal" or "Cannel," must be delivered to the undersigned at or before noon on Monday, the 27th of July.
No tender necessarily accepted.
By order,
CHAS. COSTEKER,
Town Clerk.
Town Clerk's Office, Darwen,
July 7, 1891.

Now Ready, Price 6s., bound in Cloth.

THE CHEMISTRY OF ILLUMINATING GAS.

By NORTON H. HUMPHRYS, Assoc. M. Inst. C.E., F.C.S.

The matter composing this book consists mainly of articles written for, and published in, the JOURNAL. The preface says: "In view of new processes that seem to fall in thick and fast one on the other, it has been several times suggested that they should be collected together, so as to form a record of the various gas-making processes that have been proposed in the past, together with some account of the natural laws that govern the manufacture and supply of Illuminating Gas."

The work contains chapters on: The Relative Cost of Light from Gas, Oil, and Candles; Products of Combustion; The Sulphur Question; The Composition of Illuminating Gas; Water Gas Various Gas-Making Processes; Oil Gas; Properties of Fluid Hydrocarbons; Tar for Gas-Making; Destructive Distillation Condensation; and Purification.

LONDON: WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

GORING AND STREATLEY DISTRICT GAS AND WATER COMPANY.

ISSUE OF REMAINING CAPITAL.

THE Directors desire to Call Up the remaining UNALLOTTED CAPITAL, amounting to £5105 in 1021 Shares of £5 each, to pay off sums due to the Contractor for work done, and to meet other expenses.

The Gas and Water Sections are now completed, and are working very satisfactorily. Applications for supply of both Gas and Water are increasing daily. The Directors feel confident that the Company will eventually be in a position to pay good Dividends. A guaranteed Dividend of 3½ per cent. was paid last year; and there will be a further increase of ½ per cent., making 4 per cent., for the current year.

Applications for Shares to be made on forms to be obtained of the Secretary at the Company's Offices, 5, Great Winchester Street, London, E.C.

The payments for Shares will be as follows: £1 on application; £2 on allotment; and £2 three months later.

W. H. HARDY,
Secretary.

OLDBURY LOCAL BOARD OF HEALTH.
(GAS DEPARTMENT.)

THE Gas Committee are desirous of receiving TENDERS for the supply of 6000 tons of GAS COAL, for delivery to Oldbury Great Western Station, over Twelve months from the 1st of August, 1891.

Tenders to be endorsed "Coal Tender," and to be sent to me on or before the 27th inst.

The lowest or any tender not necessarily accepted.

By order,
C. MEIKLEJOHN, Manager.

July 16, 1891.

TO COAL MERCHANTS, SHIP OWNERS, AND OTHERS.

THE Directors of the Torquay Gas Company are prepared to receive TENDERS for the supply for One, Two, or Three years, of about 12,000 tons per year (or such other quantity as may be agreed on) of best approved DURHAM GAS COAL.

Tenders to state the price of the Coals, and the freight to Torquay and Dartmouth, separately and together; and also for delivery into the Company's Works adjoining the Great Western Railway, free of all charges.

Further particulars and forms of tender to be obtained from Mr. Beynon, the Manager of the Company, Hollacombe, Paignton; and tenders to be sent to the undersigned, on or before the 31st inst.

The lowest tender not necessarily accepted; and the Directors reserve the right to accept part of any tender.

By order,
JOHN KITSON, Secretary.

Torquay, July 13, 1891.

COMMERCIAL GAS COMPANY.

THE Directors of the Commercial Gas Company are prepared to receive TENDERS for the surplus BREEZE produced at their several Works for the Twelve months ending July, 1892. The quantities are estimated to be as under, but the same cannot be guaranteed, and may be more or less:—

At the Stepney Works, in the Regent's Canal 5000 chaldrons of 48 bushels.

At the Wapping Works, in the Thames, 5000 chaldrons.

At the Poplar Works, in Bow Creek (free waterway), 5500 chaldrons.

The tenders may be for the whole or for one or more Works separately.

The Contractors must give security to remove the Breeze as it accumulates, to pay for the same monthly, and generally for the due fulfilment of the contract.

The form of agreement to be signed can be seen at the Company's Offices.

Tenders, sealed, and endorsed "Tender for Breeze," to be delivered here not later than the 30th inst.

The Directors reserve to themselves the right to accept any tender in part or in whole, and do not bind themselves to accept the highest or any tender.

Commercial Gas-Works, Stepney, E.,
July, 1891.

CORPORATION OF BEVERLEY.
(GAS DEPARTMENT.)

TENDERS FOR COAL.

THE Gas Committee are desirous to receive OFFERS for supplies of COALS and NUTS for a period of One year.

The Large Coals and Nuts are to be separately delivered as from time to time directed, by and at the expense of the Contractors, f.o.b. at Keadby, or at the Pits, or at the Railway Station, Beverley, according to the terms of contract.

The Coals or Nuts are to be the best of their respective kinds, well screened (description, sizes, and inclination of screen to be specified), to be as free as possible from Sulphur, Bats, Bind, Refuse, and Dirt, and shall be weighed (20 cwt. to the ton) upon the Corporation Machine.

Payments will be made monthly, if and so long as the contract shall be duly fulfilled.

The Corporation do not bind themselves to accept the lowest or any tender.

Further information, and forms on which the tenders must be made, may be obtained on application to me, or to Mr. Bryan at the Gas-Works, Beverley, and the tenders (sealed), specifying the description of Coals, the seam, and the pits at which they are to be raised, and stating the prices for deliveries at the several places, and in manner and subject to the conditions aforesaid, must be delivered to me on or before the 29th day of July, 1891.

By order,
JAMES MILLS,
Town Clerk.

Guildhall, Beverley,
July 13, 1891.

STRATFORD-UPON-AVON CORPORATION.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the supply of 3000 tons of good quality GAS COAL or NUTS.

Forms of tender and full particulars can be obtained upon application to

J. S. CRANMER,
Manager.

TO TAR DISTILLERS AND OTHERS.

THE Directors of the Kingston-on-Thames Gas Company are prepared to receive TENDERS for the surplus TAR produced at their Works for Twelve months from the 1st day of August, 1891, to the 30th day of July, 1892.

Price to be quoted at per gallon f.o.b., at their Wharf, Kingston-on-Thames.

Further particulars may be obtained on application to Mr. H. F. Packham, Engineer.

Sealed tenders to be sent in addressed to the Chairman not later than Wednesday, the 23nd inst.

By order,
J. A. FRICKER, Secretary.

COUNTY BOROUGH OF HALIFAX.

TO BRASSFOUNDERS.

THE Gas-Works Committee of the Halifax Corporation are prepared to receive TENDERS for the supply of BRASS GAS COCKS.

Forms of tender and further information may be obtained on application to Mr. Thomas Holgate, Engineer, Gas-Works, Halifax.

Tenders, properly endorsed, must be sent to the undersigned on or before Thursday, the 23rd of July instant.

KEIGHLEY WALTON,
Town Clerk.

Town Hall, Halifax,
July 10, 1891.

TAR AND AMMONIACAL LIQUOR.

THE Gas Committee of the Oswaldtwistle Local Board are prepared to receive TENDERS for the surplus TAR and AMMONIACAL LIQUOR produced at their Works for a period of One year commencing Aug. 1, 1891.

Full particulars can be had on application to Mr. T. Loxley, the Manager.

Tenders, endorsed "Tar," to be sent to the undersigned not later than the 29th inst.

WM. SANDEMAN,
Clerk to the Local Board.

Local Board Offices, Oswaldtwistle,
July 18, 1891.

TENDERS FOR TAR AND COKE.

THE Directors of the Nuneaton Gas Company are prepared to receive TENDERS for the surplus TAR produced at their Works during the Twelve months ending June 30, 1892. Total surplus about 180 tons.

Offers are also desired for about 450 tons, more or less, of surplus COKE.

Tenders, which in the case of the Tar must state the price offered per ton of 2240 lbs., to reach the undersigned, from whom all particulars can be obtained, not later than the 31st inst.

P. G. WINSTANLEY,
Manager.

Gas-Works, Nuneaton.

TAR.

THE Directors of the Cheltenham Gas-light and Coke Company, are prepared to receive TENDERS for the purchase of the surplus TAR produced at their Gas-Works during Twelve months from the 1st of October next.

Particulars may be obtained from the undersigned, to whom tenders must be sent on or before the 6th of August next.

The Directors do not bind themselves to accept the highest or any tender.

R. O. PATERSON,
Engineer.

Gas-Works, Cheltenham,
July 18, 1891.

BOROUGH OF ROCHDALE.

TO CHEMICAL MANUFACTURERS.

THE Gas Committee of the Corporation invite TENDERS for the supply of such quantities of BROWN OIL OF VITRIOL as they may require during the ensuing Twelve months. The Acid to be made from Pyrites or recovered Sulphur, and to be delivered at the Rochdale Railway Station.

Further information can be obtained from Mr. T. B. Ball, Manager, Gas-Works, Rochdale.

Tenders, endorsed "Vitriol," must be sent to me not later than noon of Wednesday, the 29th of July inst.

By order,
ZACH. MELLOR,
Town Clerk.

Town Hall, Rochdale,
July 16, 1891.

TENDERS FOR GAS COAL.

THE Directors of the Long Sutton Gas and Coke Company, Limited, require TENDERS for the supply of 900 tons of good screened GAS COAL, to be delivered free at Long Sutton Railway Station as follows: 75 tons in August next; 75 tons in October; 100 tons in December; and 50 tons in March, 1892. The deliveries to be on ten days' notice from the Secretaries.

Tenders, specifying the description of coal, whether 20 or 21 cwt. to the ton, and price, to be sent to the undersigned on or before the 28th inst., marked "Tender for Coals."

The Directors do not bind themselves to accept the lowest or any Tender.

MOSSOP AND MOSSOP,
Secretaries.

Long Sutton, Lincs.
July 18, 1891.

TENDERS FOR TAR.

THE Directors of the Exeter Gaslight and Coke Company invite TENDERS for their surplus TAR for One year from the 14th day of October next.

Delivery on Company's Works, filled into Purchaser's tanks.

Payments, cash monthly.

Sealed tenders, endorsed "Tender for Tar," will be received by the undersigned on or before Tuesday, the 4th day of August next; but the Directors do not bind themselves to accept the highest or any tender.

By order,
W. A. PADFIELD,
Secretary and Manager.

Gas Offices, High Street, Exeter,
July 9, 1891.

CORPORATION OF CARNARVON.

THE Gas Committee of the above Cor-poration invite TENDERS for the supply of about 1700 tons of COAL, and 150 tons of CANNEL per annum for One, Two, or Three years.

Deliveries free at Carnarvon Station.

Sealed tenders, endorsed "Tender for Coal," and addressed to the Chairman of the Gas Committee, Gas Office, Carnarvon, to be delivered not later than the 25th of July, prox.

The Gas Committee do not bind themselves to accept the lowest or any other tender.

Further particulars on application to

MAT. J. PARSONS,
Engineer and Manager.

Gas Office, Guild Hall,
Carnarvon, July 8, 1891.

WANDSWORTH AND PUTNEY GASLIGHT AND COKE COMPANY.

NOTICE is hereby given that the next ORDINARY GENERAL MEETING of the Proprietors of the above Company will be held at the Company's Offices, North Street, Wandsworth, on Thursday, the 6th of August next, at Five o'clock in the evening precisely, for the purpose of a declaration of a Dividend, and the transaction of the General Business of the Company.

The Transfer Books will be closed on and from the 24th of July, till the 6th of August, both days inclusive.

WALTER CROMARTY,
Secretary.

Offices: North Street, Wandsworth,
July 16, 1891.

LEAFLETS for Distribution by Gas Companies and Corporation Gas Committees:—

OIL OR GAS FOR LIGHTING OUR HOMES? Price (delivered free) 5s. per 100; £2 per 1000. Larger quantities by agreement. Specimen copy, by post, 1½d.

THE COMPOSITION AND USE OF GAS LIME IN AGRICULTURE. By (the late) Dr. A. VOELCKER, Professor of Chemistry to the Royal Agricultural Society of England. Price 5s. per 100, post free.

THE VALUE OF SULPHATE OF AMMONIA AS A MANURE. By F. J. LLOYD, F.C.S., Consulting Chemist to the British Dairy Farmers Association, Lecturer on Agriculture at King's College, &c. Price 5s. per 100, post free.

THE USE OF SULPHATE OF AMMONIA AS A MANURE. By WILLIAM ARNOLD, Chairman of the Tamworth Gas Company. Price 2s. 6d. per 100, post free.

Published by WALTER KING, 11, Bolt Court, Fleet Street, LONDON, E.C.

HEBBURN MAIN GAS COALS.

Produce of Gas per ton	**10,500 feet.**
„ Coke „	**13½ cwt.**
Illuminating Power	**16 candles.**

For Prices, f. o. b. Ship or delivered, apply to

W. RICHARDSON,
Hebburn Colliery Offices, NEWCASTLE-on-TYNE.

For **FIRE-BRICKS,** the most durable for **GAS-FURNACES,**

ADDRESS

JAMES WHITE & Co., Limited,
ALBERT WORKS, WIDNES.

COKE BREAKERS,

PRICES REDUCED.

(THOMAS & SOMERVILLE'S PATENT.)

New Design, with two Cutting Rollers, making less Breeze than their old pattern.

GEORGE WALLER & CO.,
PARK STREET, SOUTHWARK, E.C.

MR. W. H. BENNETT having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their Inventions may be secured for Twelve months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

SOOTHILL WOOD CANNEL.

Yield of Gas per Ton, over 12,000 Cubic Feet.
Illuminating Power - - - - - 26 Candles.
Coke per Ton, - - - - - - - 57 per cent. of a quality almost equal to that made from the best Coking Coal.

For Analysis and Price, apply to

The Soothill Wood Colliery Co., Ld.,
SOOTHILL WOOD COLLIERY,
BATLEY, YORKSHIRE.

THOMAS LIGHTING Co., LTD.,
15, CARTHUSIAN ST.,
LONDON, E.C.

Manufacturers of the "Thomas" Patent Lamps for general lighting, also for Public Buildings, Institutions, &c., and for outside purposes.

The best Regenerative Lamp in the Market.

Special quotations to Gas Companies.

JAMES OAKES & Co.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road,
CITY ROAD, LONDON, N.

Manufacture and keep in Stock at their Works (also large stock in London)

PIPES and CONNECTIONS, 1½ to 48 inches in diameter; and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with bolts, nuts, and covers, and rendering leakage impossible.

PATENTS FOR INVENTIONS,
REGISTRATION OF TRADE MARKS and DESIGNS in all Countries.

SEARCHES made *re* novelty, and opinions given on all matters connected with above. *Full particulars on application to*

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Assoc.M.Inst.C.E., M.Inst.M.E., Fel. Inst. Patent Agents,
70, CHANCERY LANE, LONDON, W.C.

Special experience in Gas and Ammonia Plant.

NEWBATTLE CANNEL.

QUOTATIONS ON APPLICATION TO

THE LOTHIAN COAL COMPANY,
LIMITED,
NEWBATTLE COLLIERIES,
DALKEITH, N.B.

CAST-IRON PIPES
FOR GAS AND WATER.

Pipes, One to Six inch Bore, kept in Stock. Also a very large assortment of all sizes of Bends, T-pieces, and Specials ready for despatch on receipt of Order.

VALVES
FOR GAS, WATER, AND STEAM.

TELEGRAMS: "PIPES GLASGOW."
WM. MACLEOD & CO.,
56, ROBERTSON STREET, GLASGOW.

THOMAS TURTON AND SONS, LIMITED,
Sheaf & Spring Works,
SHEFFIELD,
MANUFACTURERS OF
FILES OF BEST QUALITY
FOR ENGINEERS.
STEEL OF ALL DESCRIPTIONS.
SCREW STOCKS, TAPS AND DIES,
SPANNERS, RATCHET BRACES, LIFTING JACKS,
ANVILS, VICES,
AND ENGINEERS' TOOLS GENERALLY.
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THOMAS ILLINGWORTH,
NORTH DEAN CHEMICAL WORKS,
Near HALIFAX,
MANUFACTURER OF SULPHURIC ACID
OF EXTRA QUALITY FOR MAKING
WHITE SULPHATE OF AMMONIA.

TAR, LIQUOR, AND SPENT OXIDE
Purchased for Cash against Delivery.

THE SILICA FIRE-BRICK COMPANY,
OUGHTIBRIDGE, near SHEFFIELD,
MANUFACTURE
SILICA BLOCKS,
BRICKS, AND CEMENT
OF SUPERIOR QUALITY
FOR GAS-FURNACES.
Trade Mark: "SILICA."

These Goods (largely used in Gas, Glass, Iron, and Steel Works) are, on account of their
GREATER DURABILITY,
Strongly recommended where EXCESSIVE HEATS have to be maintained.

T. B. KITTEL, SHEFFIELD.
CONTRACTS FOR SUPPLIES OF ANY OF THE PRINCIPAL
ENGLISH & SCOTCH CANNELS.
REAL SILKSTONE GAS COAL
ANALYSIS AND PRICES ON APPLICATION.
T. B. KITTEL, SHEFFIELD.

THE COST OF PURIFICATION REDUCED
to a minimum by
C. & W. WALKER'S
PATENT PURIFYING MACHINE,
Which has now fully proved itself to be the most effectual, powerful, and perfect Apparatus in the World,
FOR PURIFYING GAS FROM
TAR, CARBONIC ACID, AMMONIA,
and a large portion of
SULPHURETTED HYDROGEN,
Doing all the work of Purification between the Condensers and Purifiers, and relieving them of much work.
Its cost is less than any other known Apparatus for purifying Gas from Tar and Ammonia.

Testimonials, Drawings, and Prices on Application.

8, Finsbury Circus, London, E.C.; Midland Iron-Works, Donnington, near Newport, Shropshire.

TROTTER, HAINES, & CORBETT,
Brettell's Estate
FIRE-CLAY & BRICK WORKS,
STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.
Proprietors of
BEST GLASSHOUSE POT & CRUCIBLE CLAY.
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

Lanemark Coal Co.,
LIMITED.

LANEMARK CANNEL
AND GAS COALS.

Quotations and Analysis on application to

LANEMARK COLLIERY,
NEW CUMNOCK, N.B.

Shipping Ports: All the principal Scotch Ports.

HOLMSIDE GAS COALS.
(Wrought out of Holmside and South Moor Collieries.)

PRESENT production nearly 3000 tons per working day. Area of coal about 5000 acres, including the largest remaining workable proportion of pure HUTTON SEAM GAS COAL. Analysis of HOLMSIDE GAS COAL *in bulk as shipped* gives 10,500 cubic feet of Gas per ton, of an Illuminating Power of 16½ candles. The Sulphur is about 1 per cent., and the Ash 1¾ per cent. The Coal cokes well, and leaves 69 per cent. of excellent Coke. During the year 1890, the London Gas Companies carbonized about 400,000 tons of HOLMSIDE COALS. They are used by The Gaslight and Coke Company, the South Metropolitan Gas Company, the Woolwich (Government) Gas-Works, the Newcastle and Gateshead Gas Company, the European Gas Company, L'Union des Gaz, and by many other Gas Companies both at Home and Abroad.

MR. MARK ARCHER,
HOLMSIDE AND SOUTH MOOR OFFICES,
NEWCASTLE-ON-TYNE.

UNEQUALLED.
Gas Companies are solicited to try Samples of the
MIRFIELD
BLACK BED GAS COAL.
Prices and Analysis on application.
MIRFIELD (GAS-COAL) COLLIERY COMPY.
MIRFIELD, NORMANTON.

ROBERT MARSHALL,
CANNEL COAL MERCHANT
97 WELLINGTON STREET GLASGOW.

Prices and Analysis of all the Scotch Cannels on application.

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for
CANNEL & COAL.

TYNE
BOGHEAD CANNEL.

Yield of Gas per ton	13,155 cub. ft.
Illuminating Power	38·22 candles.
Coke per ton	1,301·88 lbs.

EAST PONTOP GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	16·3 candles.
Coke	70 per cent.

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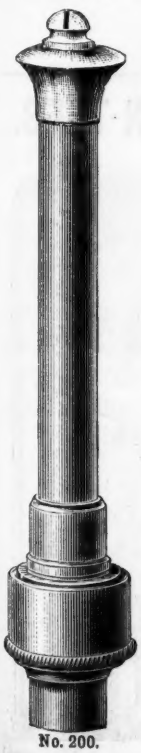

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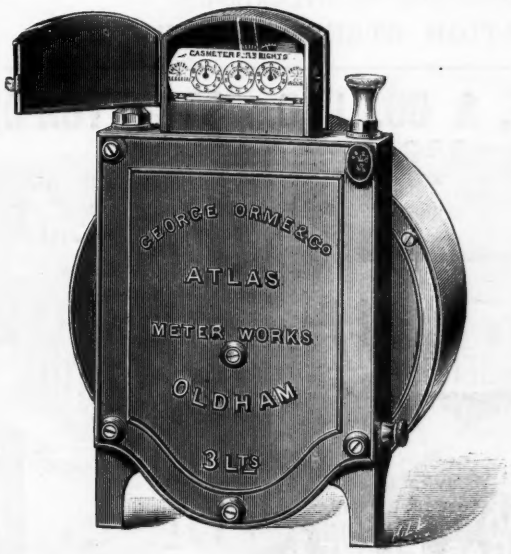

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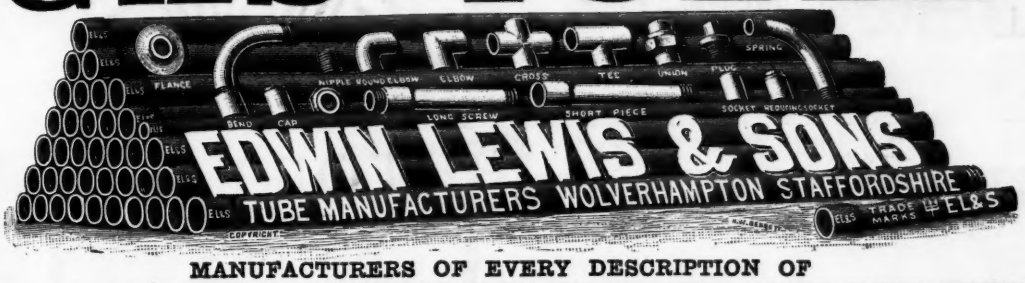

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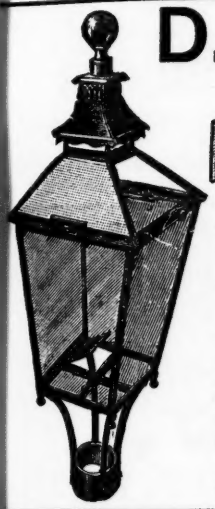

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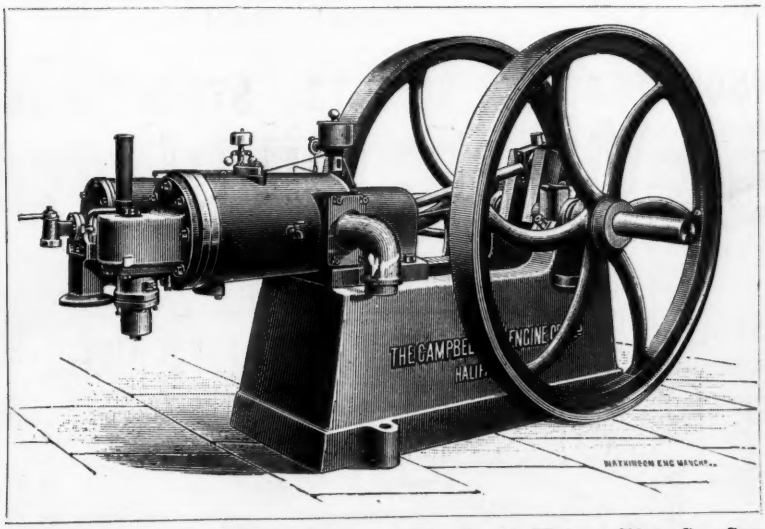

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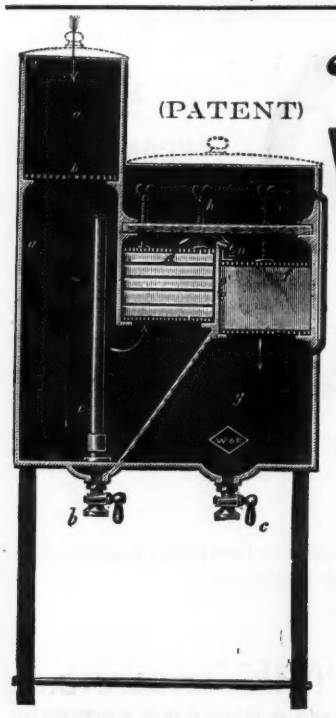

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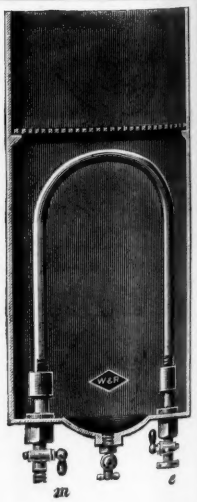

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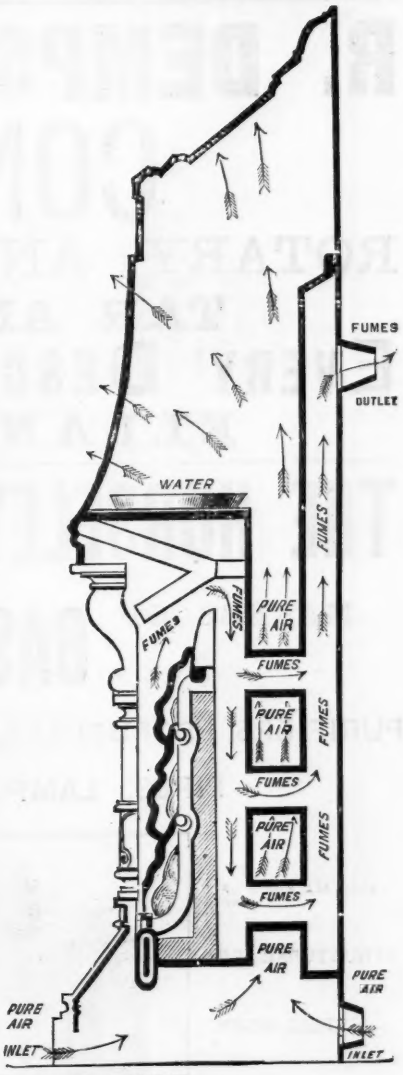

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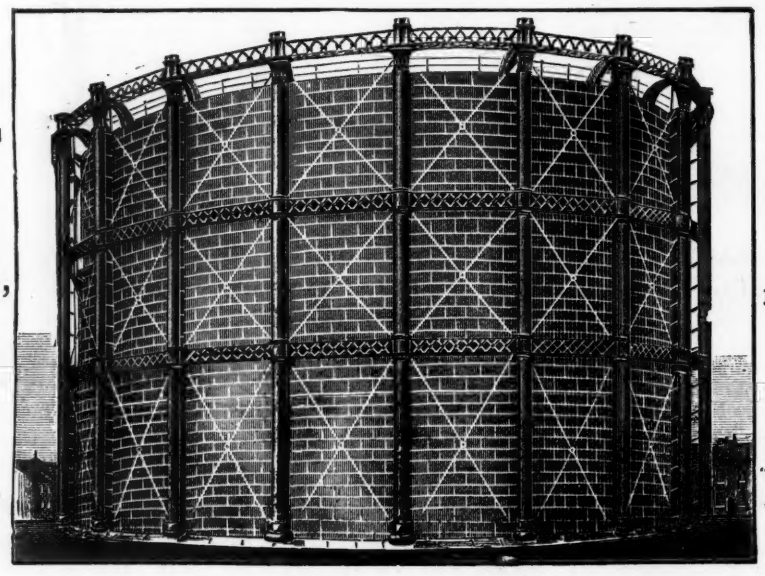

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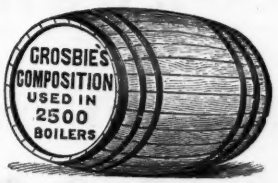

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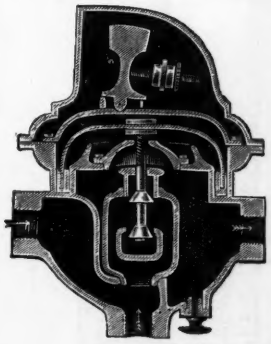

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No more Gas spoilt by over-running the Exhauster.

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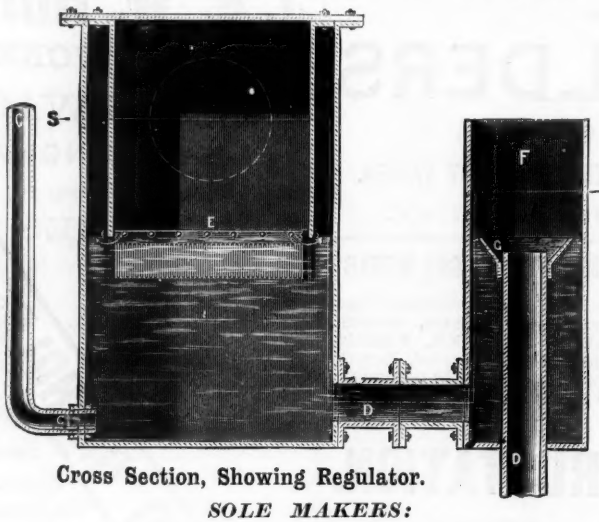

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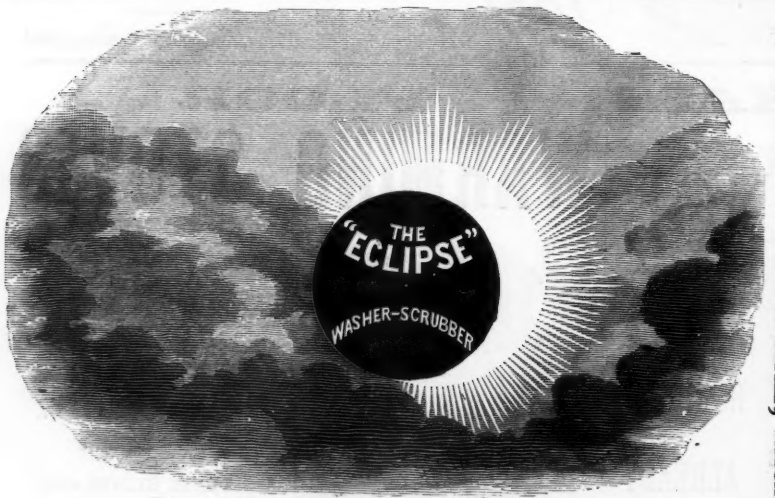

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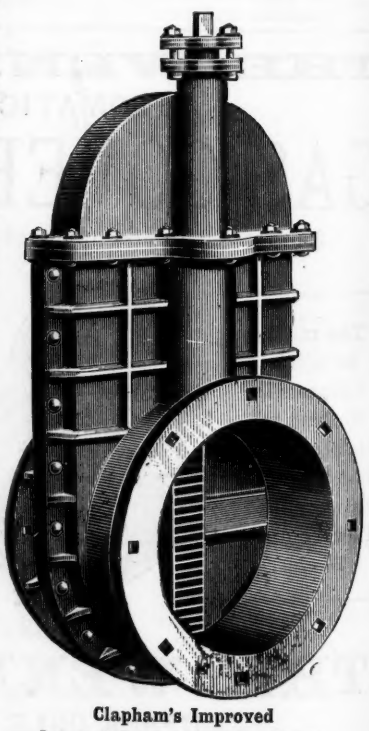
SILVER MEDAL, Inventions Exhibition, 1885.



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